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February 26, 2003

Mr. Russell Hart
Remedial Project Manager
United States Environmental Protection Agency
Region V
77 West Jackson Blvd
Mail Code SR-6J
Chicago, Illinois 60604-3590

RE: Remedial Design Work Plan
Southeast Rockford Groundwater Contamination Superfund Site; Area 9/10

Dear Mr. Hart:

On behalf of Hamilton Sundstrand Corporation (HS), SECOR International Incorporated (SECOR) is submitting the enclosed Work Plan for Remedial Design for Area 9/10 of the Southeast Rockford Groundwater Contamination Superfund Site in Rockford, Illinois. This work plan was prepared in conformance with the Administrative Order on Consent (AOC) between United States Environmental Protection Agency (USEPA) and HS dated January 13, 2003. This plan represents the culmination of the combined efforts of HS, USEPA, and Illinois Environmental Protection Agency (Illinois EPA) with regard to the scope of work to be undertaken. As stipulated in the AOC, an electronic copy of this document has also been included on the enclosed compact disc.

In effort to aid in your review process and to facilitate additional Work Plan component submittals (e.g., Health and Safety Plan, Quality Assurance Project Plan, Sampling and Analysis Plan), we would welcome any initial feedback on the Work Plan. We look forward to working with you on this effort. If you have any questions, please do not hesitate to call

Sincerely,
SECOR International Incorporated

David M. Curnock
Principal Scientist

Enclosure: Remedial Design Work Plan, Area 9/10

cc: T. Turner, USEPA
S. Moyer, HS/UTC
E. Alletzhauser, UTC
T. Williams, IEPA
T. Ayers, IEPA

RDWPtrns022603

Remedial Design Work Plan
Southeast Rockford Groundwater Contamination Site
Area 9/10

Rockford, Illinois

CERCLIS ID No. ILD9801000417

February 27, 2003

Prepared for:

HAMILTON SUNDSTRAND CORPORATION
4747 Harrison Avenue
Rockford, Illinois 61125

Submitted by:

SECOR International Incorporated
446 Eisenhower Lane North
Lombard, Illinois 60148

TABLE OF CONTENTS

TABLES **PAGE NO.**

FIGURES **PAGE NO.**

APPENDICES

Appendix A FIELD SAMPLING PLAN

Appendix B QUALITY ASSURANCE PROJECT PLAN

Appendix C HEALTH AND SAFETY PLAN

SECTION 1

SECTION 1.0
INTRODUCTION

INTRODUCTION

This document represents the Remedial Design (RD) Work Plan prepared on behalf of Hamilton Sundstrand Corporation (HS), a United Technologies Corporation (UTC) company, for Area 9/10 of the Southeast Rockford Groundwater Contamination Superfund Site ("SER Site") located in the southeastern portion of Rockford in Winnebago County, Illinois. This RD Work Plan has been prepared in accordance with the Administrative Order on Consent (AOC) entered into between the United States Environmental Protection Agency (USEPA) and HS on January 13, 2003 for the performance of a RD under the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) for Area 9/10 of the SER Site.

PROJECT OBJECTIVES

The objective of this RD effort is to collect and evaluate additional site information to allow the preparation of a design package for the future performance of a Remedial Action (RA) to fulfill the goals the Record of Decision (ROD) established for Area 9/10. The ROD states that source materials (volatile organic compounds) exist within Area 9/10 that require remedial attention. These source materials are to be addressed through the application of two remedial technologies: 1) soil vapor extraction and 2) enhanced air-sparging. The goal of this RD effort is to prepare a remedial design package utilizing the selected remedial technologies.

Area 9/10 includes an existing interim status Resource Conservation and Recovery Act (RCRA) facility on the HS property. This unit has been out of service for approximately 10 years. During this period, HS pursued closure of the unit with the Illinois Environmental Protection Agency (IEPA). In 1999, the IEPA informed Hamilton Sundstrand that this unit would be incorporated into the CERCLA efforts being

conducted in the area. Through cooperation with the IEPA, information and activities in support of closure of this unit will be undertaken as part of this RD effort.

HS will undertake three general steps to meet the project objectives. These steps consist of 1) a pre-design investigation, 2) pilot study, and 3) preparation of the remedial design. Each of these steps is described in detail below.

Pre-Design Investigation

The pre-design investigation (PDI) involves various data collection activities to support the preparation of the final remedial design package. The PDI will include the collection of soil and groundwater data within and around the reported source areas within Area 9/10 to provide focus and site-specific application details for the design.

Pilot Study

Pilot tests will be completed to provide empirical support for the application of the selected remedial technologies and to provide site-specific application details as a basis for the overall design. A vapor extraction pilot test and an enhanced air-sparging pilot test will be performed in fulfillment of this objective.

Remedial Design

Based on the information collected in the PDI and Pilot Study, a remedial design package will be prepared. The design will provide for the application of the selected remedial technology to mitigate source materials identified within Area 9/10 to the appropriate levels.

WORK PLAN ORGANIZATION

The remainder of this RD Work Plan outlines the administrative and technical activities necessary for the performance of the RD effort at Area 9/10. The RD Work Plan is presented in sections that correspond to certain activities or procedures leading to the completion of a remedial design package.

Section 2 of this RD Work Plan presents the organizational structure of the RD effort. It identifies the significant organizations and entities and provides a brief description of their responsibilities.

Section 3 of this RD Work Plan provides a summary of the project background and history. A general history of the SER Site, local/area geologic and hydrologic conditions, a discussion of Area 9/10 and HS, summarized results of previous investigation efforts, a summary of the remedial investigation and feasibility study for Area 9/10, and a summary of the ROD are presented in this section.

Section 4 of this RD Work Plan describes the field activities to be undertaken as part of the PDI. Soil boring protocols, groundwater monitoring well installation and sampling protocols, and pilot test monitoring activities are discussed in this section. The Field Sampling Plan (FSP), Quality Assurance Project Plan (QAPP), and Health and Safety Plan (HASP) constitute support documents for this section.

Section 5 of this RD Work Plan describes the data evaluation and summary reporting for the PDI activities.

Section 6 of this RD Work Plan describes the Pilot Study activities. These activities include preparation of a Pilot Test Work Plan, installation and operation of a small-scale system, data evaluation, and report preparation.

Section 7 of this RD Work Plan describes the remedial design activities. These activities include the preparation of a preliminary design and basis of design report; identification of equipment, services and utilities; pre-final design; and final design.

Section 8 of this RD Work Plan provides a brief summary of the major submittals to be prepared in accordance with the AOC in fulfillment of the RD effort.

Section 9 of this RD Work Plan provides a schedule of the major project activities and deliverables for the RD effort.

SECTION 2.0

PROJECT ORGANIZATION AND RESPONSIBILITIES

The following provides the organizational structure and a description of the responsibilities of each entity identified. As part of the overall project organization and implementation effort, the entities listed below on behalf of HS will assist, as requested, in the performance of community relation's activities.

ORGANIZATIONAL CHART

This RD effort requires the combined efforts of HS and its contractor(s), the USEPA, and the IEPA. The organizational chart included as Figure 2.1 provides the outline of interactions and responsibilities of the various entities within the HS team and the USEPA and IEPA contacts.

USEPA REMEDIAL PROJECT MANAGER

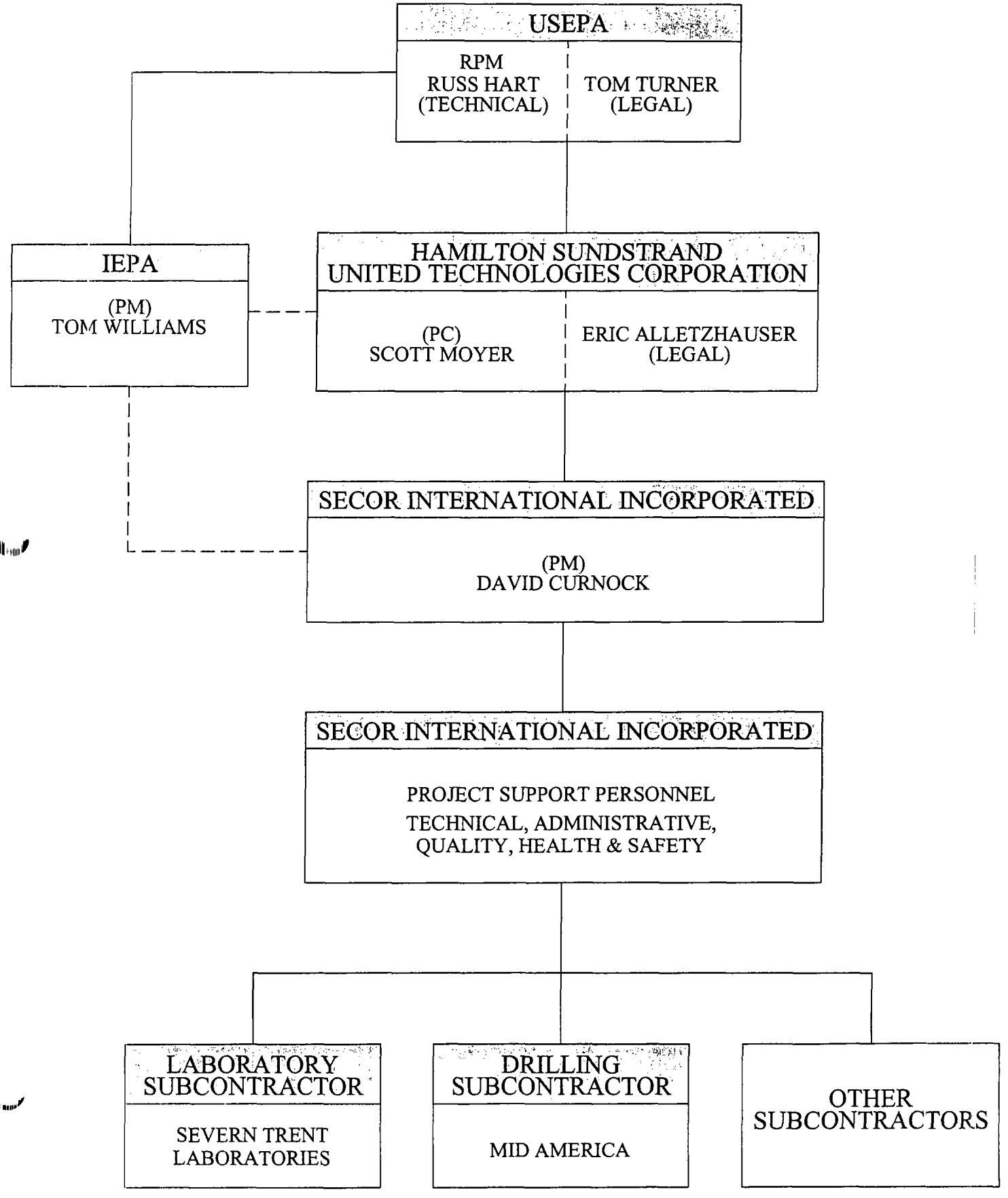
The USEPA Remedial Project Manager (RPM) is the primary point of contact for the USEPA. This individual has control over the administrative and technical aspects of the RD effort on behalf of the USEPA. The USEPA RPM will coordinate activities with the IEPA's Project Manager (PM) and HS/UTC. The USEPA designated RPM is as follows:

Mr. Russell Hart
United States Environmental Protection Agency, Region V
77 West Jackson Blvd.
Chicago, Illinois 60604-3590
T(312) 886-4844 F(312) 353-5541 or F(312) 886-4071
E-mail: hart.russell@epamail.epa.gov

Mr. Hart will be supported internally within the USEPA as necessary on legal issues by USEPA regional counsel. The USEPA regional counsel contact is as follows:

Mr. Thomas Turner
United States Environmental Protection Agency, Region V
77 West Jackson Blvd.
Chicago, Illinois 60604-3590
T(312) 886-6613 F(312) 886-0747
E-mail: turner.tom@epamail.epa.gov

FIGURE 2.1
ORGANIZATION CHART



STATE REGULATORY AGENCIES

The IEPA will provide support to the USEPA and HS/UTC during the performance of this RD effort. The IEPA will work closely with the USEPA, the signatory authority on the AOC prescribing this RD effort. To this end, the IEPA will provide technical and administrative oversight of this RD on behalf of, and in conjunction with, the USEPA. The IEPA has identified its project manager to be as follows:

Mr. Thomas Williams
Illinois Environmental Protection Agency
12 Gunia Drive,
PO Box 1515
LaSalle, Illinois 61301-3515
T(815) 223-1714 F(815) 223-1344
E-mail: epa4414@epa.state.il.us

Mr. Williams will be supported by other IEPA personnel as necessary. Additional RD support will be provided by the following IEPA senior personnel:

Mr. Terry Ayers
Illinois Environmental Protection Agency
1021 North Grand Avenue East
Springfield, Illinois 62794
T(217) 782-9875 F(217) 557-1165
E-mail: epa4126@epa.state.il.us

OVERSIGHT CONTRACTORS

At this time, the USEPA has not designated an oversight contractor for this effort. The IEPA has indicated that Camp, Dresser, & McKee, Inc. (CDM) will provide oversight on behalf of the IEPA. The primary contact for CDM for the oversight effort is as follows:

Kent Whiting
Camp, Dresser, & McKee, Inc.
125 South Wacker Drive
Suite 600
Chicago, Illinois 60606
T(312) 396-5000 F(312) 346-5228

PROJECT COORDINATOR

The Project Coordinator (PC) is HS's designated individual to interact with the USEPA and the IEPA with regard to this RD effort. The PC will be supported by additional HS and UTC personnel as well as primary and secondary subcontracted entities. The combination of these entities under the direction of the PC will be responsible for the implementation of the activities identified in this RD Work Plan. The PC for the RD effort on behalf of HS is as follows:

Mr. Scott Moyer
United Technologies Corporation
Mail code M/S 296-6
4747 Harrison Street
Rockford, Illinois 61112
T(815) 226-6232 F(815) 226-2699
scott.moyer@hs.utc.com

Mr. Moyer will be supported internally as necessary on legal issues by UTC corporate counsel. The UTC corporate counsel contact is as follows:

Mr. Eric Alletzhauser
United Technologies Corporation
One Financial Plaza
Hartford, Connecticut 06010
T(860) 728-7895 F(860) 728-6227
alletzew@corphq.utc.com

The PC will be supported by personnel from SECOR, HS/UTC's primary contractor, for the implementation of this RD Work Plan. As indicated in the organizational chart previously presented in this section, SECOR has designated the following individual as the Project Manager (PM) responsible for this RD effort.

Mr. David Curnock
SECOR International Incorporated
446 Eisenhower Lane North
Lombard, Illinois 60148
T (630) 792-1680 F(630) 792-1691
E-mail: dcurnock@secor.com

Mr. Curnock will be supported by other SECOR technical, administrative, quality, and health and safety staff. In addition to SECOR personnel, various subcontractors and suppliers will be utilized in the performance of the RD effort. The two significant subcontractors will be Severn Trent Laboratories (STL) for analytical laboratory services and Mid America Drilling for soil boring and monitoring well installation services.

SECTION 3.0
BACKGROUND INFORMATION

INTRODUCTION

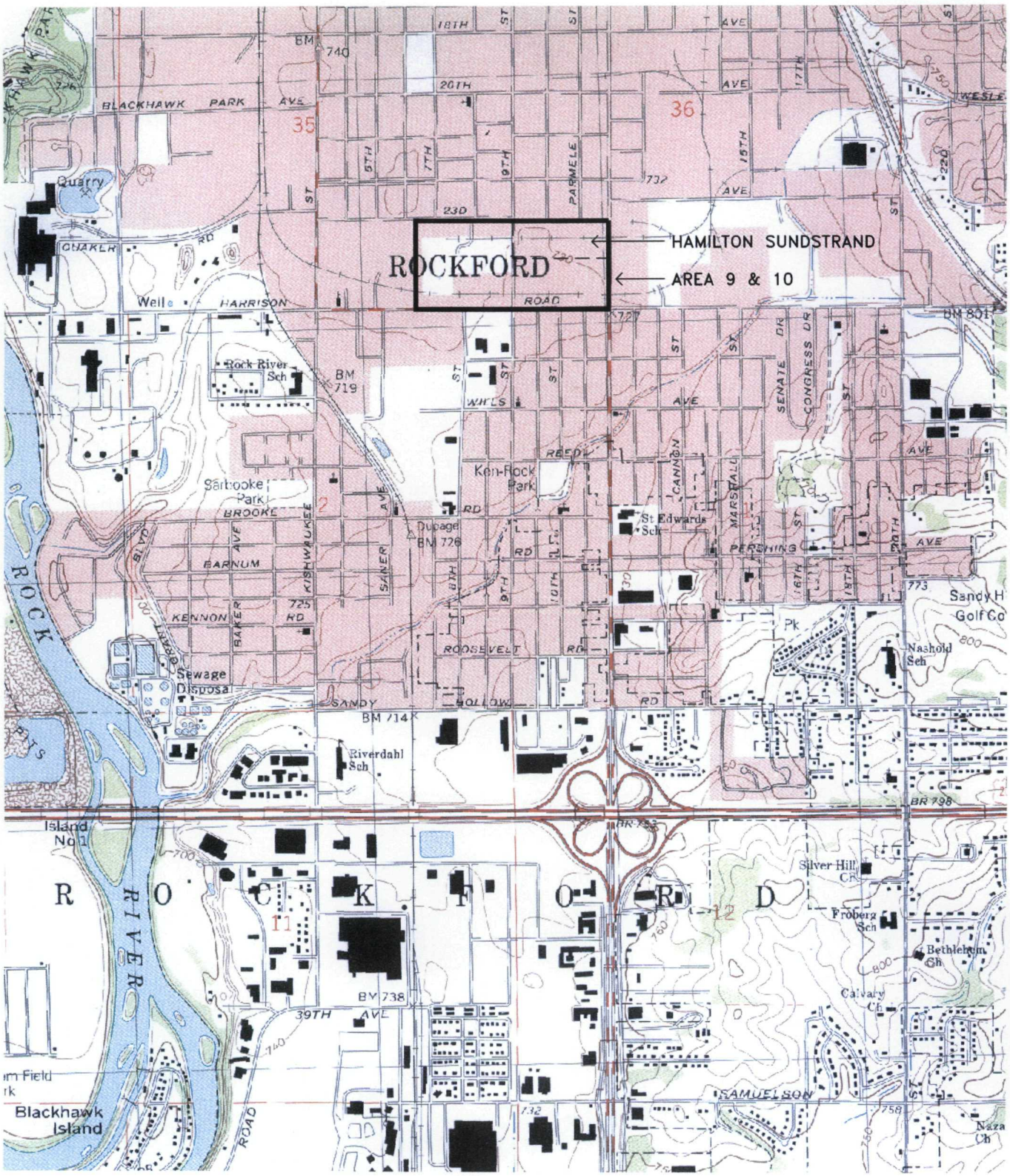
Area 9/10 is located in the southeastern portion of the city of Rockford (City), Winnebago County, Illinois (Figure 3.1). Rockford is one of the largest metropolitan areas in Illinois. Historically, Rockford has been known as a center of industry with regards to its base of manufacturing, especially in the tool and machining areas. The Rockford area is transected by the Rock River that flows from north to south. The surface and subsurface geologic conditions were shaped by glacial actions that have created a bountiful groundwater resource. The combination of geological and industrial conditions in the southeastern portion of Rockford result in a groundwater system that is vulnerable to contaminant introduction and transport.

Investigations and other studies performed by regulatory agencies, municipalities, and private entities over the past several decades have identified the existence of groundwater impacts from many sources. Of greatest concern has been the identification of volatile organic compounds (VOCs) in potable groundwater.

The remainder of this section presents a general summary of the geologic and hydrologic conditions within the vicinity of Area 9/10, a general history of the SER Site, summary discussions of the most recent remedial investigation and feasibility studies performed under CERCLA by IEPA, and a discussion on the 2002 ROD that identified the remedial alternatives selected for the four source areas, including Area 9/10.

LOCAL GEOLOGY AND GROUNDWATER

The local geologic conditions in the vicinity of Area 9/10 consist of unconsolidated glacial sediments over highly eroded bedrock. These glacial sediments belong to the Mackinaw Member of the Henry Formation. The Mackinaw Member is characterized as



REFERENCE: USGS 7.5 MINUTE QUADRANGLE: ROCKFORD SOUTH, IL

DESIGNED BY: GLH	SECOR	SITE LOCATION MAP HAMILTON SUNDSTRAND AREA 9/10 ROCKFORD, ILLINOIS
DRAWN BY: GLH		
APPROVED BY: JGH		
DATE: 2-12-03		JOB NO. 13UN.02072.00 FIGURE 3.1

S:\PROJECTS\013 lombard projects\13UN.02072.00 Rockford\secor rd\rd workplan\061 figure 3.1.dwg gh 1-28-03

glacial outwash comprised predominantly of sands and gravels with variable amounts of finer-grained silts and clays Some fine-grained lenses or zones are reported to exist within the sand-based matrix materials. These zones have been shown to be discontinuous in nature. Information from a soil boring advanced near Area 9/10 indicated the presence of a fine-grained layer at a depth of approximately 120 to 130 feet below ground surface (bgs).

Bedrock in the vicinity of Area 9/10 has been determined to lie at approximately 230 to 240 feet. The bedrock encountered at the base of unconsolidated glacial deposits is the Ancell Group (sandstone). This Paleozoic bedrock group is the basement bedrock of a pre-glacial bedrock valley. The Rock Bedrock Valley is a deep bedrock valley that trends from the east to the west and southwest across Area 9/10. This ancient bedrock valley is considered a significant controlling geologic feature with respect to groundwater flow in the area.

Groundwater is known to be present in an unconfined state within the glacial deposits in Area 9/10. The depth to groundwater in this area is approximately 30 feet bgs. Groundwater flow direction for Area 9/10 is generally to the west, southwest towards the Rock River. Underlying bedrock is also saturated and considered to be hydraulically connected to the unconsolidated materials.

The measured and calculated mean hydraulic conductivity for the vicinity of Area 9/10 has been reported as 3.89 x 10e-5 ft/sec (1.19 x 10e-3 cm/sec). The mean hydraulic conductivity of the underlying sandstone has been reported as 1.05 x 10e-4 ft/sec (3.20 x 10e-3 cm/sec).

SOUTHEAST ROCKFORD GENERAL HISTORY

In 1981, the City became aware of the presence of VOCs in groundwater. The IEPA and Illinois Department of Public Health (IDPH) became aware and involved with the groundwater impacts in 1984. Investigation ensued by IPDH (1984-1989) along with

Illinois State Water Survey (ISWS) in 1986. The primary VOCs identified consisted mainly of 1,1,1-trichloroethane (TCA), trichloroethene (TCE), and tetrachloroethene or perchloroethene (PCE). Based, in part, on the results of these investigations, the City closed several municipal wells in the area.

The SER Site was proposed for inclusion on the National Priority List (NPL) in June 1988. The SER Site was added to the NPL in March 1989 as a state-lead, federally-funded Superfund site.

During 1989, the USEPA's Technical Assistance Team (TAT) investigated residential wells and determined the need for an immediate removal action to provide bottled water to impacted residences. Carbon filters were then installed in lieu of bottled water. USEPA extended water mains and provided hookups to nearly 300 residences in 1990. IEPA, through CDM, collected samples from over one hundred residential wells in 1990 as part of the Operable Unit Remedial Investigation (for Operable Unit One)

As part of the Operable Unit One efforts, the IEPA identified an additional 264 homes to be connected to municipal water services. In addition, a carbon treatment system was installed for a municipal well (Rockford Well No. 35) in order to bring it into safe production. This operable unit was classified as an immediate removal action and was included in the ROD signed on June 14, 1991 by USEPA/IEPA. The remedial alternative was certified as functioning in a remedial action report completed by USEPA/IEPA and signed on December 21, 1992.

In total, three operable units were established for the SER Site. The second operable unit addressed the groundwater contamination issues present throughout the SER Site. The third operable unit was to address suspected significant continuing sources of groundwater degradation.

As part of Operable Unit Two, the IEPA performed a remedial investigation and

As part of Operable Unit Two, the IEPA performed a remedial investigation and feasibility study (RI/FS) of the approximately 10 square mile area bounded to the north by Broadway Avenue, Sandy Hollow Road to the south, Mulford Road to the east, and the Rock River to the west. This effort was undertaken between 1992 and 1995. The RI/FS identified numerous potential source areas. Of the approximate fifteen potential major source areas, four areas were selected as the primary potential sources for continuing groundwater degradation. Based on the information collected during the RI/FS, the agencies issued a ROD for Operable Unit Two on September 25, 1995 to address the area-wide groundwater impacts.

The 1995 ROD was focused on the present and future contamination in potable use wells and groundwater contamination. The ROD finalized temporary control measures such as the carbon treatment unit on Rockford Municipal Well 35. It also called for source control measures at the four areas that were determined by IEPA to be the most significant sources of continued groundwater impacts. However, no remedies for source control were cited. Instead, this issue was addressed as Operable Unit Three (soil contamination), the source control effort.

The 1995 ROD indicated that Groundwater Management Zones (GMZs) were to be established for each of the source control areas identified for further activities. Also, the 1995 ROD stated that the City would maintain water resources for the area, provide monitoring, and enforce the necessary use restrictions (for 205 years). Based on the presence of multiple potential responsible parties (PRPs) (an extremely complicated management and coordination issue) the City assumed the responsibility for Operable Unit Two through a separate consent order in 1998 that was amended in 1999.

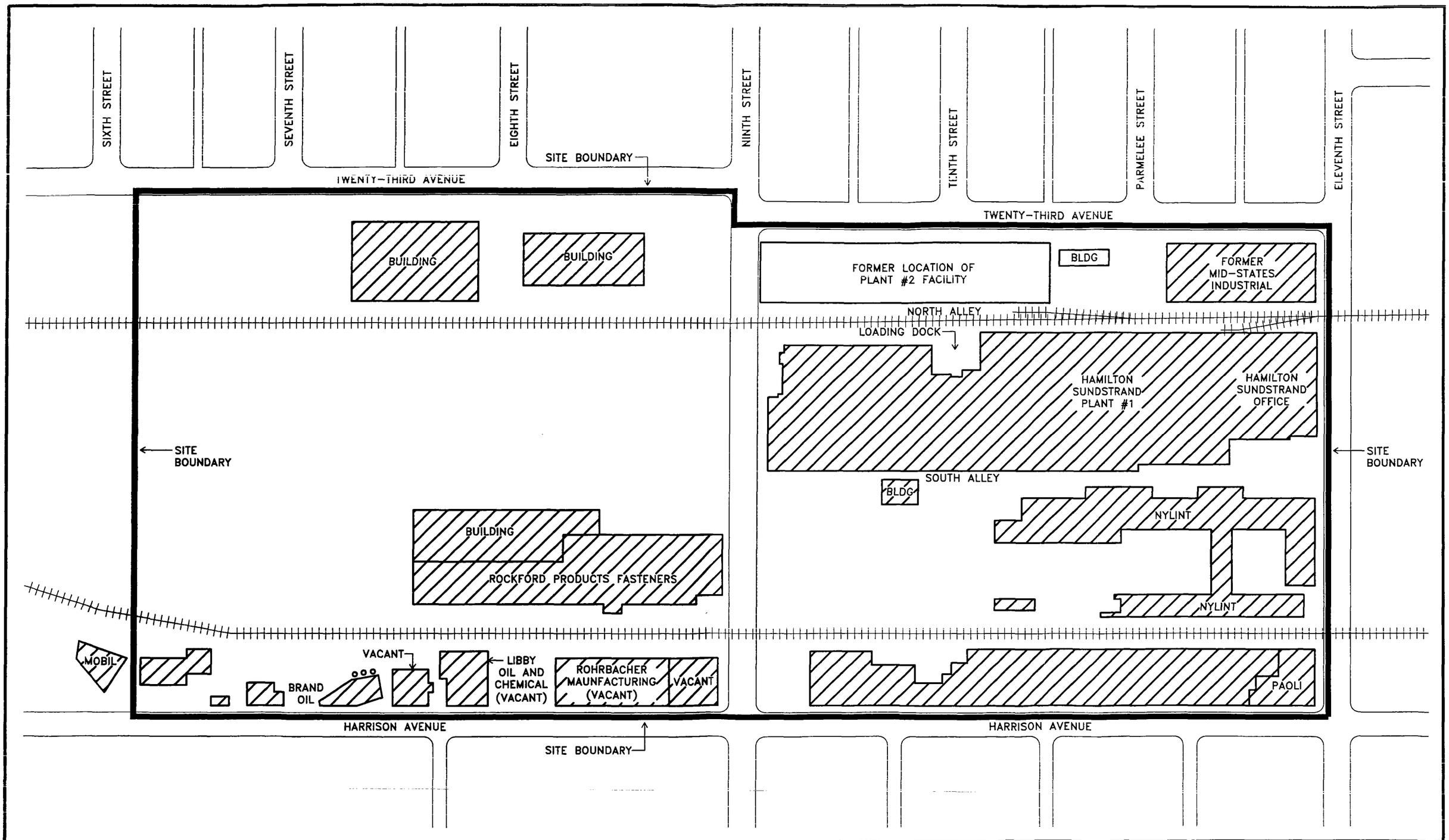
Beginning in 1996, IEPA (CDM) undertook additional RI/FS activities at the four identified source areas. This effort is known as Operable Unit Three otherwise identified as the source control operable unit (SCOU). The four source areas are designated numerically as Areas 4, 7, 9/10, and 11. The HS Plant #1 is located within Area 9/10.

HAMILTON SUNDSTRAND FACILITY AND AREA 9/10

The HS facility is located in the northeastern portion of Area 9/10. Area 9/10 is an industrial area that is bounded by 11th Street to the east, 23rd Avenue to the north, Harrison Avenue to the south and 6th Street to the west. This portion of Rockford is a historical industrial area that dates back to the early 1900's with Rockford Tool and Rockford Milling Machine companies merging to form the Sundstrand Machine Tool Company in 1926. From the early 1900's through 2003, many different industrial companies have operated within Area 9/10. Current and former occupants of Area 9/10 include Rockford Products, Midstates Industrial, Nylint Corporation, General Electric, Paoli Manufacturing, Rohrbacher Manufacturing, Libby Oil and Chemical, and J.L Clark. Area 9/10 is shown in Figure 3.2.

The HS facility is located at 2421 11th Street within Area 9/10. This HS facility manufactures and tests parts, such as fuel pumps, for the aviation industry. The HS facility is generally split in a north/south fashion by an east/west trending rail spur line. The northern portion of the facility includes parking areas and an electric co-generation plant. The southern portion of the facility consists of the main plant (Plant #1) and a small parking area. With the exception of the parking area and two drive areas along the north and south sides of Plant #1, the entire southern portion of the HS facility is covered by the building footprint. The HS facility is shown in Figure 3.3.

Plant #1 houses both office and manufacturing operations. The eastern portion of Plant #1 is predominantly office space. The western sections of Plant #1 include manufacturing, testing, storage, and shipping/receiving areas. Plant #1 includes several additions and modifications that have taken place over the past several decades.



DESIGNED BY:	MGD
DRAWN BY:	GLH
APPROVED BY:	MGD
DATE:	2-12-03

SECOR

AREA 9 & 10 LOCATION

HAMILTON SUNDSTRAND
AREA 9/10
ROCKFORD, ILLINOIS

JOB NO. 13UN.02072.00 FIGURE 3.2

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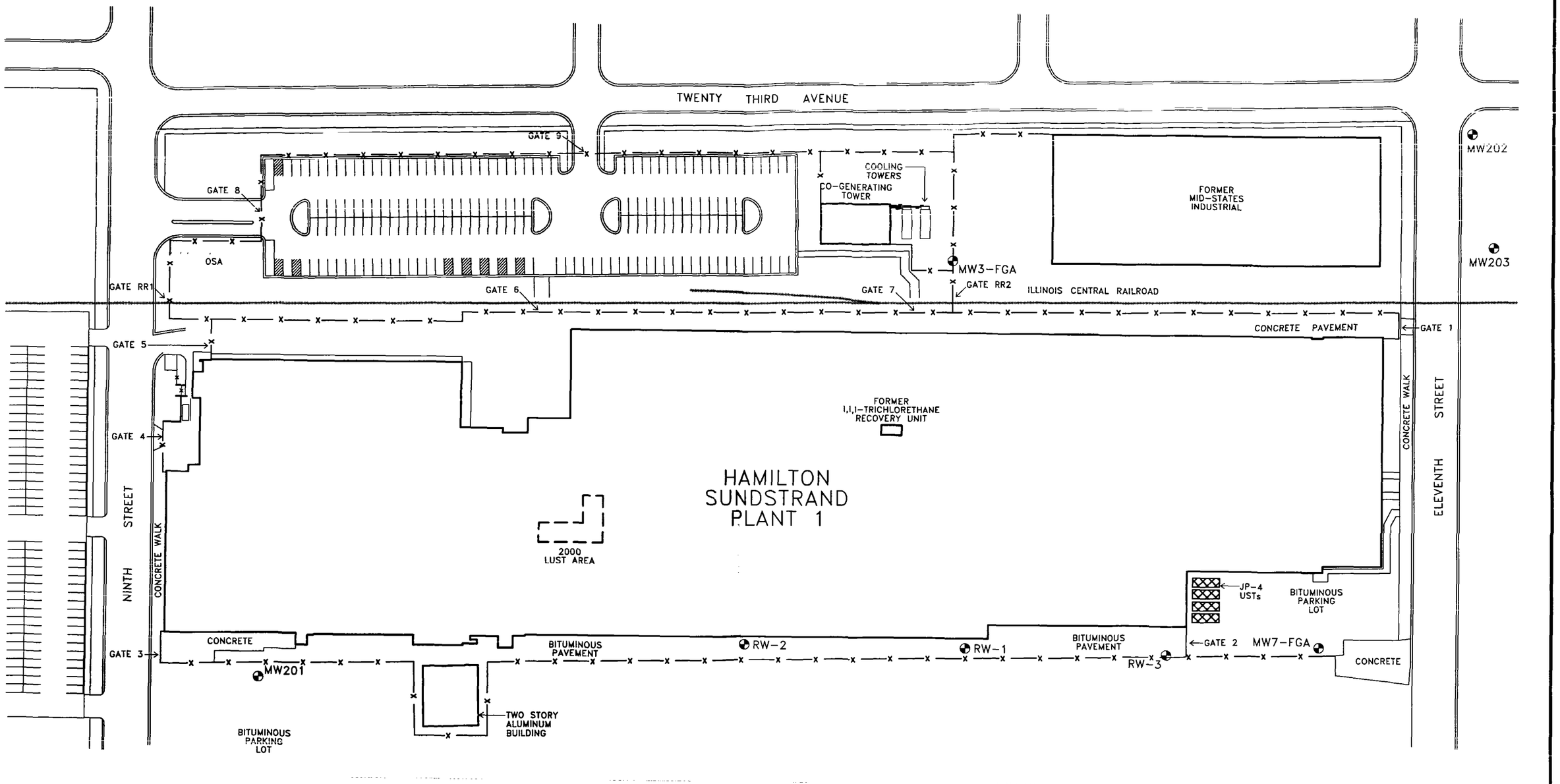

LEGEND:

- EXISTING MONITORING WELL
- FENCELINE

NORTH

0 20 50 100
SCALE IN FEET

DESIGNED BY:	MGD
DRAWN BY:	GLH
APPROVED BY:	MGD
DATE:	2-12-03

SECOR

HAMILTON SUNDSTRAND FACILITY

HAMILTON SUNDSTRAND
AREA 9/10
ROCKFORD, ILLINOIS

JOB NO. 13UN.02072.00 FIGURE 3.3

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PREVIOUS ENVIRONMENTAL INVESTIGATIONS

Over the past several decades, several investigations or environmentally-oriented actions have been undertaken in and around the HS facility. These actions have addressed underground storage tanks (USTs), hazardous waste management units, and other remedial activities. The following paragraphs summarize some of the major activities over the years.

In 1962 a significant addition was made to the Plant #1 building extending it to the west. During the 1962 facility expansion, six USTs were abandoned in place and the building addition was constructed over top. These tanks were reported to have previously been used to store used oil, solvents, lubricating oil, and gasoline. In 2000 during an interior renovation and testing station installation effort, these abandoned USTs were encountered and removed. A leaking underground storage tank (LUST) incident was reported as directed by the Illinois State Fire Marshal on the scene (reference IEMA #20001409). Of the six USTs discovered, three exhibited signs that they may have leaked. Impacted soils were removed from the area at this time. Due to space constraints within the building, not all of the impacted soils could be removed.

Approximately 50 cubic yards of impacted soil were removed from the UST area for disposal. A concrete hold-down pad was found to exist below the backfill (sand) surrounding the USTs. Due to the thickness of the pad (approximately 12 inches) and the limitations of the inside work area, the pad was inspected and left in place. There was no evidence of cracks or failures in the hold-down pad; therefore this pad serves to minimize infiltration.

Soil samples were collected from the excavated area and analyzed for VOCs. VOCs detected included PCE at 4.640 mg/Kg, TCA at 7.130 mg/Kg, cis-1,2-dichloroethene (DCE) at 3.180 mg/Kg, and TCE at 4.580 mg/Kg.

The 2000 LUST area was backfilled and product test stand equipment was erected in the area.

The HS facility is known to have had several former USTs located on the premises. There are currently several active, properly registered and compliant USTs at the HS facility. These active USTs are mainly used for the storage of new jet fuel and one-pass-test jet fuel. The one-pass-test jet fuel is sometimes referred to as "waste" jet fuel in that the strict testing standards imposed by the Department of Defense on the aviation fuel pumps only allow virgin fuel to be used for testing. Therefore, once the fuel has been run through a fuel pump being tested, it can no longer be used in any other portion of the process. The main testing area with the active USTs is located on the southern portion of the HS facility. The new jet fuel USTs are located in the parking area in the southeastern portion of the HS facility. The one-pass-test, or "waste" jet fuel USTs are located in the area known as the south alley (driveway area south of the building).

The USTs located in the south alley are of current design with secondary containment and leak detection systems on the USTs and all associated piping. These USTs replaced previous systems that had been removed and that were known to have released jet fuel to the subsurface. During the UST removal and replacement process, some impacted soils were also removed. The historical subsurface release of jet fuel (circa 1990) was reported to the IEPA and product recovery activities were undertaken. Three recovery wells are currently located in the south alley where the previous leaking USTs and piping had been removed. These recovery wells were visually assessed and measured for the presence of any free-phase petroleum (jet fuel) in late 2002. No separate phase petroleum was detected or identified in any of the three recovery wells.

Two active USTs are located in the area known as the loading dock. These USTs are registered and in compliance with appropriate state and federal regulations. The USTs are used for Stoddard solvent storage. The loading dock is an open area used for shipping and receiving. It is located on the northern side of Plant #1 about halfway

between 9th Street and 11th Street. This area formerly contained up to 14 historical USTs. These former USTs were removed in 1987 and some of the soil in the area was also removed. The area was backfilled and repaved for continued use. The former USTs were known to contain a variety of substances including used oil and new and used solvents.

An additional historical UST was located in association with the former RCRA outside container storage area (OSA) situated on the western end of parking area north of the railroad spur. Historically, the parking area was occupied by a building (Plant #2), that contained the OSA. The OSA was used to store waste solvents and other materials. The OSA consisted of a paved area that was sloped towards a collection sump which in turn was piped to a UST (Tank #24). This UST was removed in 1992 as part of previous RCRA closure activities undertaken at the OSA.

The OSA has been removed from service for several years. The OSA was constructed in 1962 as a storage area for bins containing metal chips from machining operations. The OSA consisted of a concrete paved area approximately 65 feet long and 30 feet wide that sloped to a trench. The trench was a concrete lined trench that was approximately 8 inches deep extending 57 feet along the north side of the pad. The bins were placed on metal grating covering the trench and the cutting oils adhering to the metal chips were allowed to drain off into the trench. The trench was piped to an UST. The UST was installed in 1962 during the original construction of the OSA. In the 1970's a metal roof was added to the OSA.

Other drummed wastes were stored in the OSA beginning in 1982. The OSA was the primary storage area until 1985 when the container storage area at Plant #1 was expanded. The OSA was used after 1985 for overflow storage, machine cleaning, and miscellaneous waste paint storage. In 1989, bins containing RCRA F006 wastes were stored in the OSA. This practice was discontinued as of January 1991.

The OSA was removed from service along with the associated UST (Tank #24) in 1992. The concrete pad remains in place with a gravel cover to provide a level surface. The area is surrounded by a chain link fence.

Initially, the OSA was considered for RCRA Part B inclusion. However, HS decided to close the unit rather than proceed with the permitting process. During the initial closure process, the presence of significant concentrations of chlorinated VOCs in the near surface soils were identified (PCE at 3,500 mg/Kg). This information was provided to the IEPA. Ultimately, additional closure efforts were postponed because the IEPA indicated that, since the OSA was included within Area 9/10, it was to be addressed under CERCLA.

Historical operations within the HS facility included recycling of TCA. This action was undertaken at the Waste Recycling Area (WRA). The former WRA is an area located inside Plant #1 that was used from approximately 1975 until 1992 for the recycling of TCA. The TCA recovery unit covered an area of approximately 200 square feet (10 feet by 20 feet). The unit was placed on the concrete floor within the building. In 1984, a concrete curb was added that surrounded the entire area as a secondary containment structure. The recycling unit was a Phillips Still model AV8541. Two air-driven diaphragm pumps were used in the operation. The TCA to be recycled was approximately 90 percent TCA and ten percent oil and grease.

Used TCA was transferred from the operations equipment (primarily vapor degreasers) into 55-gallon drums or a vacuum tank truck and delivered to the WRA. The solvent was then transferred to a 600-gallon stainless steel aboveground holding tank that was hard-piped into the still. The resultant reclaimed solvent was then transferred to a second 600-gallon stainless steel holding tank. The reclaimed solvent was used in other operations on the site, most commonly cold cleaning activities. Residuals and still bottoms were transferred to drums for proper disposal. There have been no reported releases from the former WRA. The area where the WRA formerly existed has since been incorporated into other plant operational use.

REMEDIAL INVESTIGATION SUMMARY

The IEPA began the SCOU Remedial Investigation (RI) in 1996. This SCOU RI activity focused on the four source areas identified during the previous RI/FS in support of the second ROD (1995).

The RI for the four identified source areas consisted of soil gas surveys, soil sampling, surface water and sediment sampling, non-aqueous phase liquid (NAPL) determinations, and groundwater sampling. The investigation conducted within Area 9/10 consisted of a soil gas survey, soil sampling, field NAPL testing, groundwater monitoring well installation, and groundwater sampling. Samples from the soils beneath Plant #1 were not collected. However, it must be noted, that no interior building samples were collected at any of the other facilities located within Area 9/10 or the other three potential source areas. The RI efforts for Area 9/10 were completed by 1997. The RI report dated July 25, 2000, for the source control efforts, was issued to the public in June 2001. The RI report includes the results of the field efforts. A brief summary of the findings for Area 9/10 is presented below.

A soil gas survey was conducted over Area 9/10. Soil gas samples were analyzed for several VOCs including PCE, TCE, TCA, and total BETX (benzene, ethyl benzene, toluene, and xylenes). In addition to the soil gas survey, soil borings were advanced to facilitate the collection of soil samples for corroboration with the soil gas survey results, test for NAPL, provide geologic/hydrogeologic information, and to install monitoring wells. Soil gas survey locations, soil boring locations, and monitoring well locations from the RI effort are provided in Figures 3.4, 3.5, and 3.6, respectively.

Soil gas results identified concentrations of TCA, PCE, TCE and BETX compounds within Area 9/10. These results are included in Figures 3.7, 3.8, 3.9, and 3.10, respectively. TCA was identified as the compound detected at the highest concentrations throughout Area 9/10. The highest concentration of TCA was identified on property owned by Rockford Products and currently used for parking. This property

is located south of the HS facility. The highest concentrations of PCE were identified near the Rockford Products plant located west of Ninth Street. The highest soil gas concentrations of TCE were also identified in this same area. Soil gas results for total BETX did not show any significant indications of impacts with the exception of southeastern portion of Area 9/10 that is directly adjacent to Area 11. Area 11 is known to contain petroleum-based NAPL.

Soil samples collected from areas identified during soil gas efforts did not show high concentrations of any VOC compounds. Results of the soil sampling are presented in Figure 3.11. In addition to the soil gas and soil samples, field analysis for the presence of NAPL using the Sudan IV procedure did not identify any potential NAPL at any of the sampling locations. Some soil samples were also collected and analyzed from below the water table at some locations. Groundwater is present at approximately 30 feet bgs in Area 9/10. There were no significant detections of any compounds in any of the soil samples analyzed. It was concluded in the RI report that the soil samples were not taken at the source areas and that volatilization from groundwater into soils was the reason for the lack of correlation between the soil gas and the soil sampling results.

Three groundwater monitoring wells were installed as part of this RI effort. These wells were located to the north of Area 9/10 east of 11th Street (MW202 and MW203) and southwest of the HS facility (MW201). In addition to these newly installed wells, two existing wells on the former Midstates Industrial facility located northeast of Plant #1 were sampled. Figure 3.6 presents the results the RI sampling event. Of the five wells sampled, MW201 exhibited the highest concentrations of VOCs. Sample results identified a concentration of TCA at 12,000 ug/L. Other VOCs detected included 1,2-DCE at 4,500 ug/L, 1,1-DCE at 850 ug/L and 1,1-DCA at 690 ug/L. The RI report indicates that NAPL is presumed to be present in Area 9/10 based on groundwater concentrations in well MW201. This well is located adjacent to the southwest corner of HS Plant #1 in the parking lot owned by Rockford Products.

MW201 is also one of the monitoring wells that is included in the City's ongoing site-wide groundwater monitoring network. Shortly after the installation and sampling of MW201 by IEPA in 1996, MW201 was destroyed at the surface. As part of the site-wide monitoring program, this well was reinstalled. The location of the current MW201 is indicated to be within approximately 50 feet of the original MW201 and screened at the same interval. Initial samples collected in February 2000 through October 2001 (six sampling events) from the reinstalled MW201 under the site-wide groundwater monitoring effort did not display elevated concentrations of TCA similar to those found in the RI sampling in 1996. The highest concentration of TCA detected between 2000 and 2001 was 110 ug/L. However, a recent sample collected in mid- 2002 identified the presence of a higher TCA concentration similar to the 1996 level.

CDM interpolated the soil gas data and the results of the groundwater sample analyzed from MW201 and identified the HS Plant #1 loading dock area as a "source" for the groundwater impacts identified in Area 9/10. The loading dock area is a portion of the HS facility that is known to have contained many USTs historically. Also, the OSA, an area formerly utilized to store RCRA hazardous waste that is located at the west end of the facility, was also indicated as being a "source" area of groundwater impacts. The RI report provided little data to support this interpolation. As such, the report did indicate that further data collection was warranted.

FEASIBILITY STUDY SUMMARY

A focused FS for the SCOU (FFS) was completed by the IEPA and a report dated September 5, 2000 was issued in June 2001 for this operable unit. The FFS report presented the risk analysis of the compounds of concern, identified the potential remedial actions, and described the remedy evaluation process for each of the four areas investigated during the SCOU RI.

The FFS presented remedial objectives for each area. The source control remedial objectives established for Area 9/10 consist of preventing the public from ingestion of

and contact with impacted shallow groundwater; preventing ingestion and direct contact with impacted soils; preventing the public from inhalation of contaminants from disturbed impacted soil; and preventing migration of impacts from Area 9/10 that would result in continued degradation of site-wide groundwater or surface water in excess of State and federal standards to the extent practical and feasible.

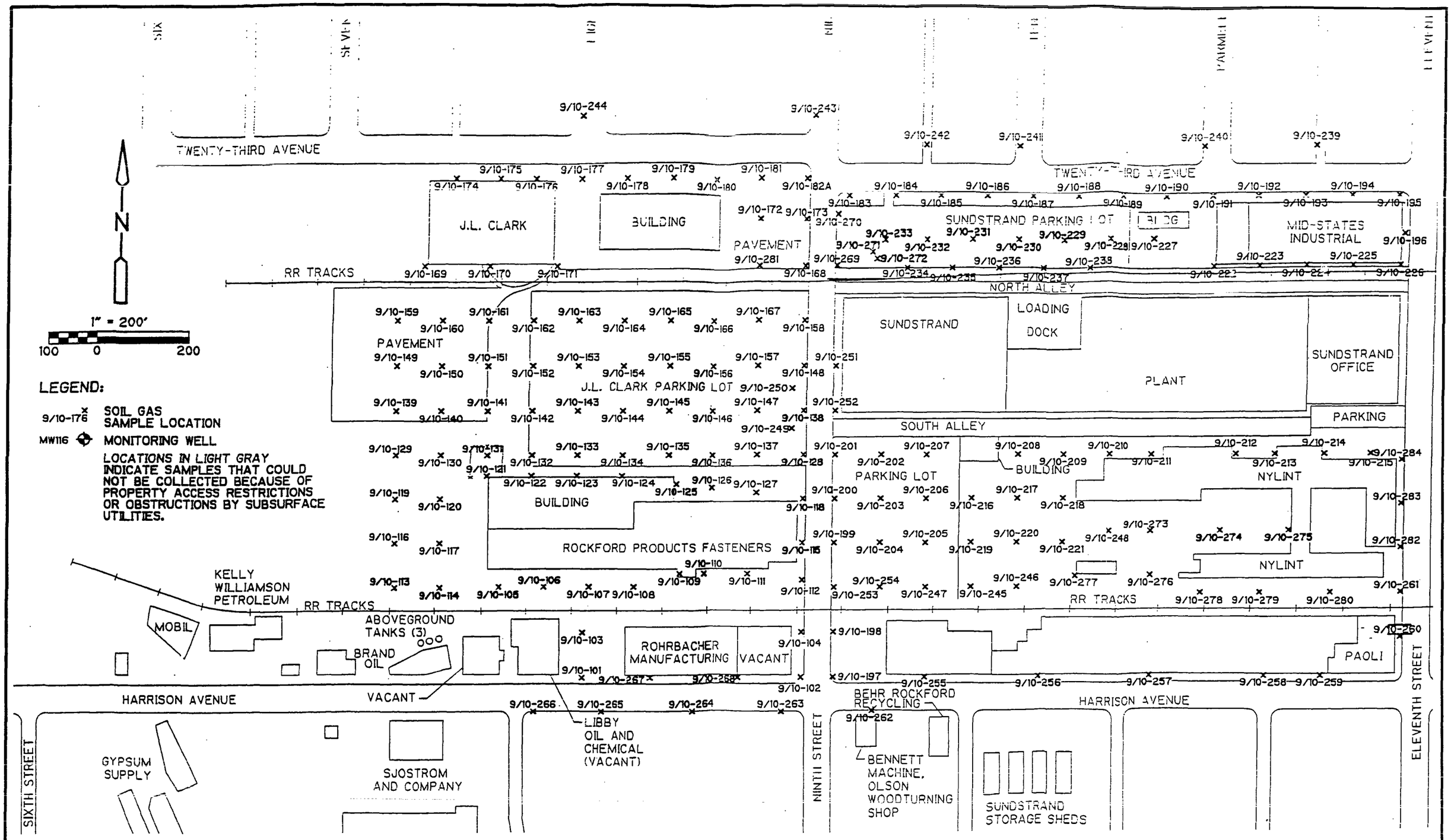
As a part of the FFS, the remedial alternative evaluation included consideration of the applicable or relevant and appropriate requirements (ARARs). Remedies ultimately selected would be subject to either meeting the federal or more stringent state ARARs to be consistent with the NCP. If compliance with ARARs can/could not be achieved, a specific waiver from that ARAR would need to be established. These ARARs provide the basis for the evaluation of the remedies and their application with respect to cleanup standards, standards of control, or other substantive requirements concerning hazardous substances. ARARs are grouped into three categories:

1) Chemical specific requirements,
2) Location specific requirements, and
3) Action specific requirements.

Each category is examined with respect to federal and state requirements (regulations, laws, etc.). The evaluation and identification of ARARs provides the basis of the framework for the risk assessment effort in the determination of acceptable contaminant concentration objectives.

Risk Assessment Summary

The FFS included a summary of the human health risk assessment that was performed for each of the four identified source areas (4, 7, 9/10, and 11). The human health risk assessment followed a tiered approach in conformance with Title 35, Illinois Administrative Code Part 742, Tiered Approach to Cleanup Objectives (35 IAC 742, TACO). The objective of this risk assessment was to identify concentrations of chemicals of concern that could remain in place in the source areas after remedial



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DRAWN BY:	GLH
APPROVED BY:	MGD
DATE:	2-05-03

SECOR

AREA 9/10 RI SOIL GAS SURVEY LOCATIONS

HAMILTON SUNDSTRAND
AREA 9/10
ROCKFORD, ILLINOIS

JOB NO. 13UN.02072.00 FIGURE 3.4

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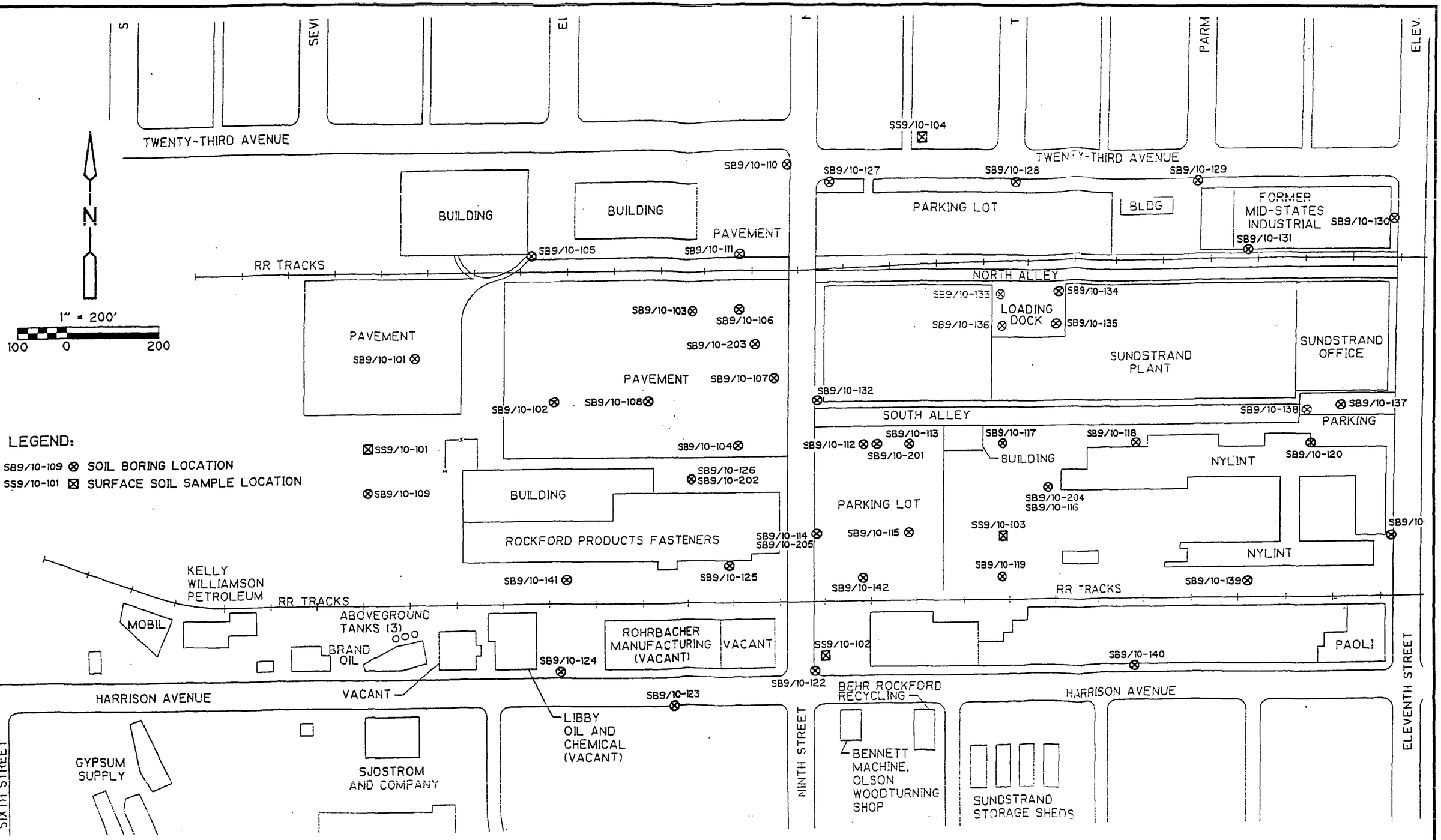

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AREA 9/10 RI SOIL BORING AND SAMPLING LOCATIONS

HAMILTON SUNDSTRAND
AREA 9/10
ROCKFORD, ILLINOIS

JOB NO. 13UN.02072.00 FIGURE 3.5

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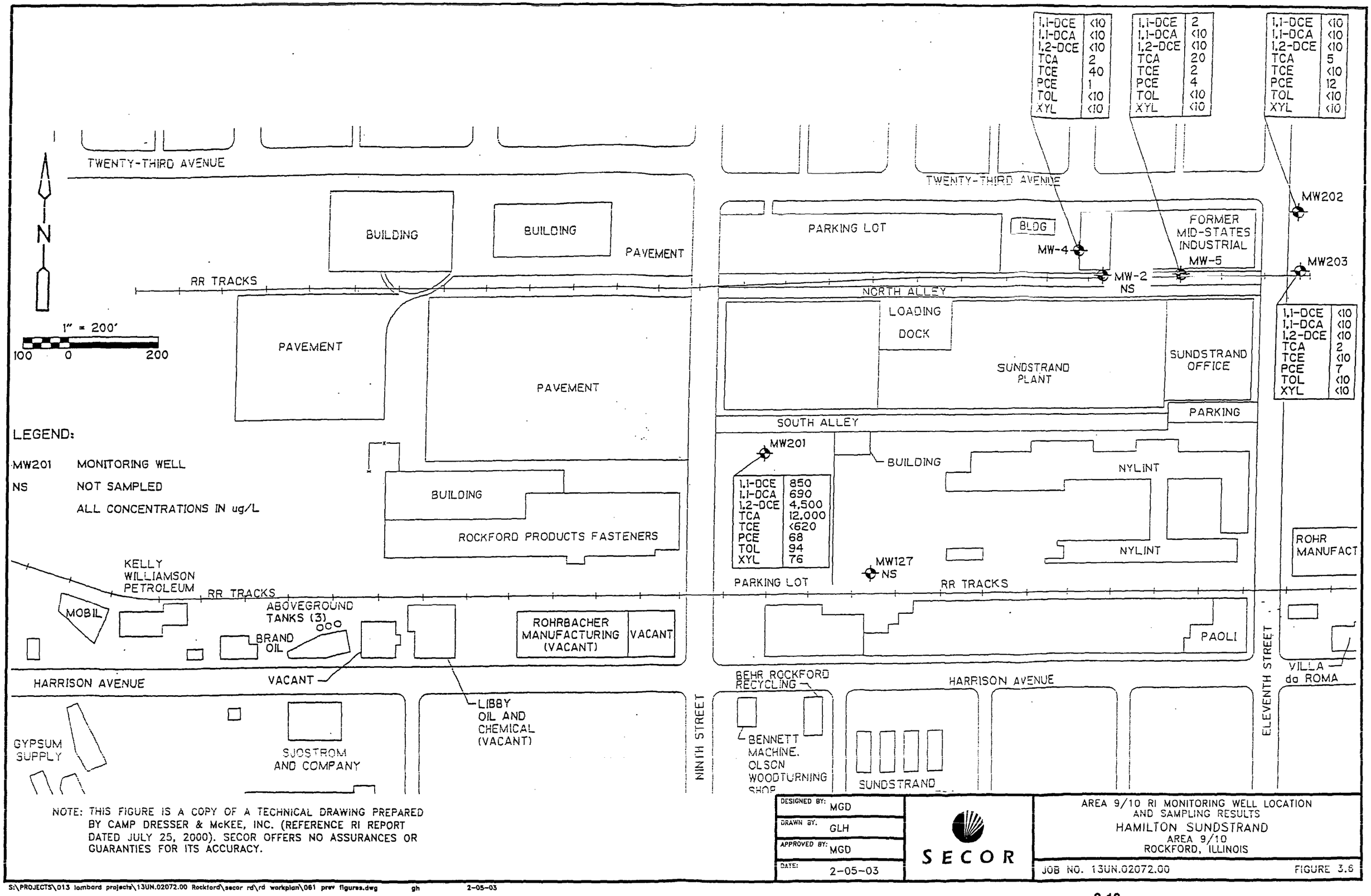

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AREA 9/10 RI MONITORING WELL LOCATION AND SAMPLING RESULTS
HAMILTON SUNDSTRAND
AREA 9/10
ROCKFORD, ILLINOIS

JOB NO. 13UN.02072.00 FIGURE 3.6

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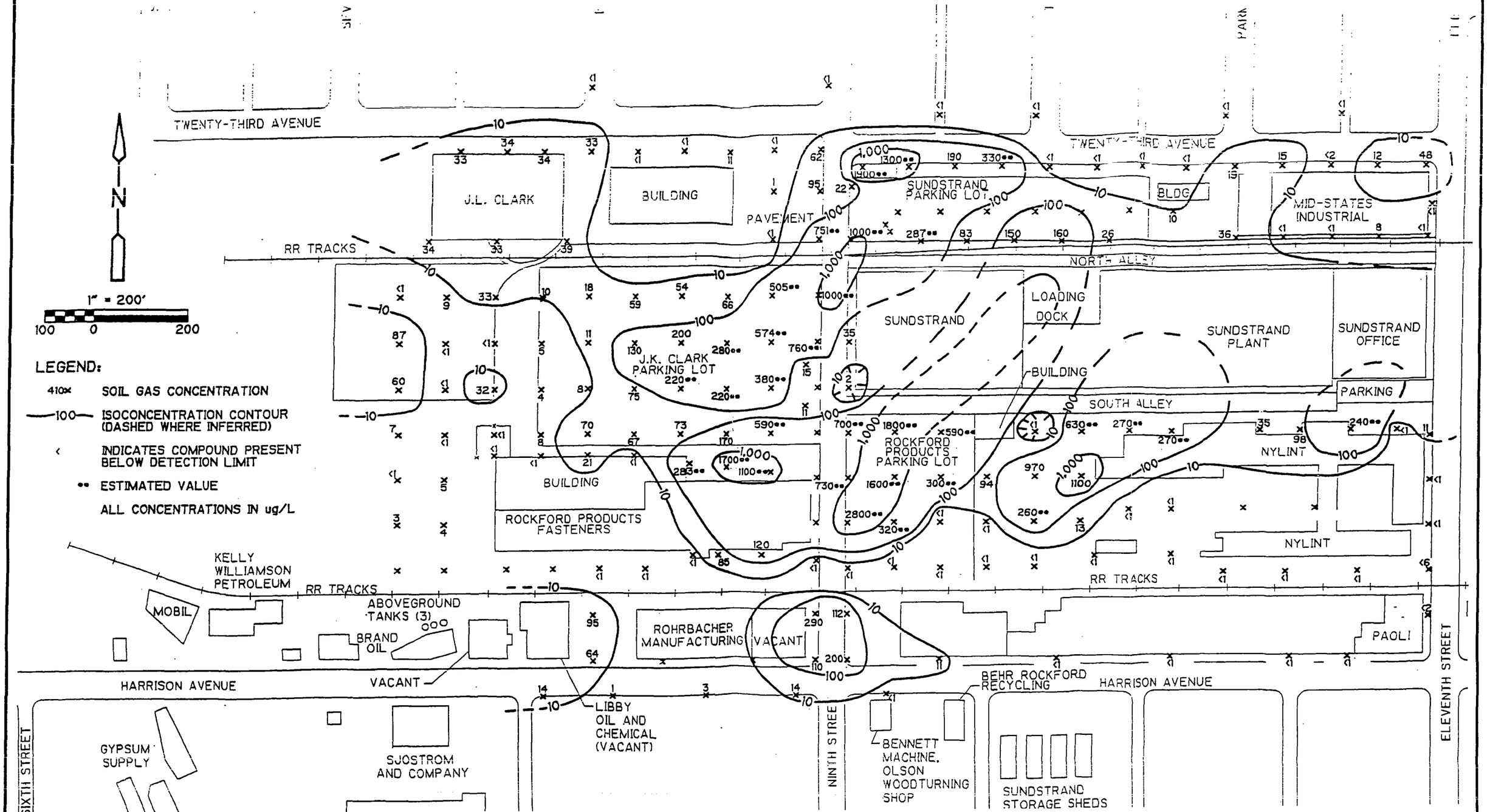

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AREA 9/10 RI SOIL GAS SURVEY RESULTS - TCA

HAMILTON SUNDSTRAND
AREA 9/10
ROCKFORD, ILLINOIS

JOB NO. 13UN.02072.00 FIGURE 3.7

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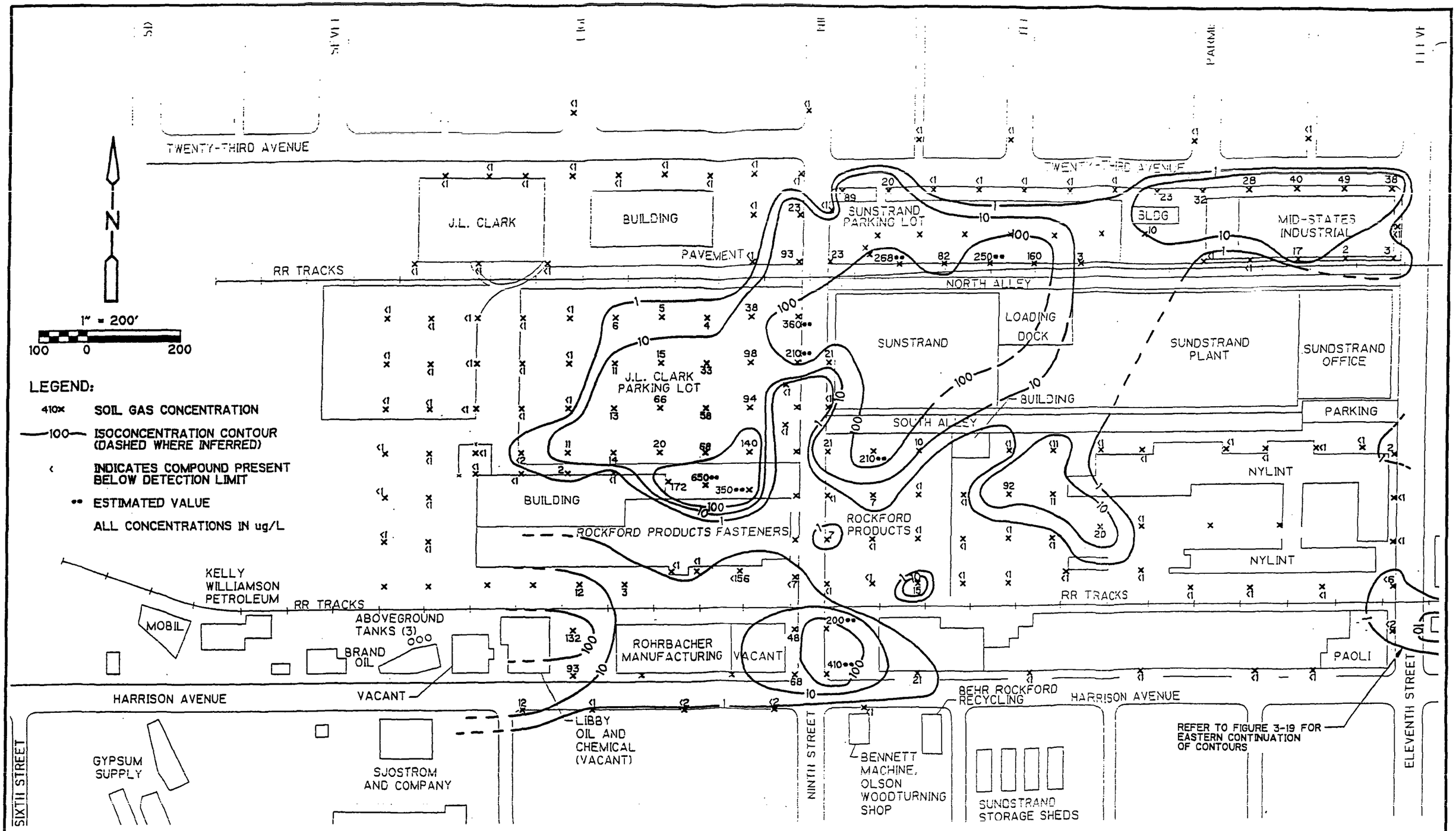

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AREA 9/10 RI SOIL GAS SURVEY RESULTS – PCE

HAMILTON SUNDSTRAND
AREA 9/10
ROCKFORD, ILLINOIS

JOB NO. 13UN.02072.00 FIGURE 3.8

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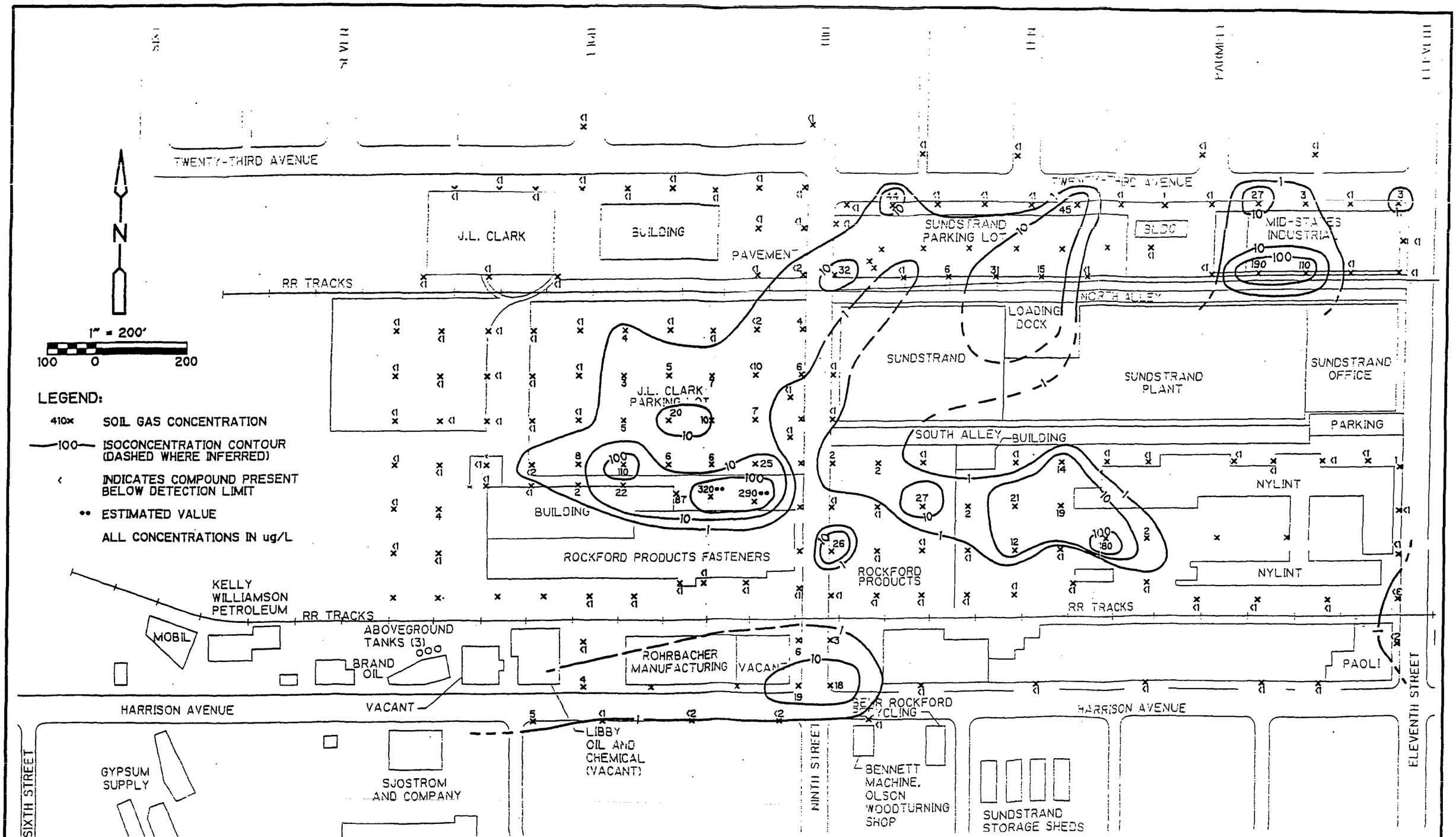

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AREA 9/10 SOIL GAS SURVEY RESULTS – TCE

HAMILTON SUNDSTRAND
AREA 9/10
ROCKFORD, ILLINOIS

JOB NO. 13UN.02072.00 FIGURE 3.9

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N

1" = 200'

100 0 200

LEGEND:

3199 × SOIL GAS CONCENTRATION

—100— ISOCONCENTRATION CONTOUR (DASHED WHERE INFERRED)

< INDICATES ONE OR MORE COMPOUND PRESENT BELOW DETECTION LIMIT

•• ESTIMATED VALUE

ALL CONCENTRATIONS IN ug/L

SIXTH STREET

TWENTY-THIRD AVENUE

RR TRACKS

J.L. CLARK

BUILDING

PAVEMENT

J.L. CLARK PARKING LOT

SUNDSTRAND PARKING LOT

BLDG

MID-STATES

NORTH ALLEY

LOADING DOCK

SUNDSTRAND

SUNDSTRAND PLANT

SUNDSTRAND OFFICE

SOUTH ALLEY

PARKING

ROCKFORD PRODUCTS

NYLINT

ROCKFORD PRODUCTS FASTENERS

KELLY WILLIAMSON PETROLEUM

MOBIL

ABOVEGROUND TANKS (3)

BRAND OIL

VACANT

ROHRBACHER MANUFACTURING

VACANT

PAGLI

HARRISON AVENUE

BEHR ROCKFORD RECYCLING

LIBBY OIL AND CHEMICAL (VACANT)

NINTH STREET

ELEVENTH STREET

GYPSUM SUPPLY

SJOSTROM AND COMPANY

BENNETT MACHINE, OLSON WOODTURNING SHOP

SUNDSTRAND STORAGE SHEDS

REFER TO FIGURE 3-16 FOR EASTERN CONTINUATION OF CONTOURS

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AREA 9/10 SOIL GAS SURVEY RESULTS – BETX

HAMILTON SUNDSTRAND
AREA 9/10
ROCKFORD, ILLINOIS

JOB NO. 13UN.02072.00 FIGURE 3.10

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LEGEND:

⊗ SOIL BORING

ABBREVIATIONS:

MCL	METHYLENE CHLORIDE
A	ACETONE
1,1-DCE	1,1-DICHLOROETHENE
1,2-DCE	1,2-DICHLOROETHENE
2-B	2-BUTANONE
TCA	1,1,1-TRICHLOROETHANE
TCE	TRICHLOROETHENE
1,1,2-TCA	1,1,2-TRICHLOROETHANE
PCE	TETRACHLOROETHENE
T	TOLUENE
X	XYLENE
OTHER VOCs	INDICATES ALL OTHER VOCs INDIVIDUAL
<10	UNDETECTED AT METHOD DETECTION LIMIT

ALL DEPTHS ARE GIVEN IN FEET BELOW GROUND SURFACE
ALL CONCENTRATIONS IN ug/kg

N

1" = 200'
100 0 200

SB9/10-203	43'-45'
TCA	1
PCE	8
OTHER VOCs	<12

SB9/10-106	23'-25'	28'-30'
VOCs	<11	<10

SB9/10-127	15'-17'	27'-29'
MCL	<14	<15
A	<11	3
T	3	18
OTHER VOCs	<11	<12

SB9/10-135	15'-17'	27'-29'
MCL	3	3
TCA	<10	2
TCE	1	2
PCE	7	46
T	<10	3
OTHER VOCs	<10	<10

SB9/10-134	15'-17'	27'-29'
MCL	4	48
TCE	1	<10
PCE	20	<10
OTHER VOCs	<10	<10

SB9/10-129	15'-17'	20'-22'
A	6	4
T	5	<11
OTHER VOCs	<11	<11

SB9/10-131	15'-17'	20'-22'
MCL	5	6
OTHER VOCs	<11	<11

SB9/10-137	15'-17'	27'-29'
MCL	3	3
TCE	2	<11
PCE	2	<11
OTHER VOCs	<10	<11

SB9/10-120	15'-17'	20'-22'
MCL	5	6
OTHER VOCs	<10	<11

SB9/10-112	15'-17'	20'-22'
T	<11	1
OTHER VOCs	<11	<10

SB9/10-126	15'-17'	20'-22'
MCL	<10	<13
A	2	6
T	<10	6
OTHER VOCs	<10	<12

SB9/10-116	15'-17'	20'-22'
MCL	6	<10
OTHER VOCs	<11	<10

SB-11-204	41'-43'
A	<11
2-B	<11
TCA	<11
PCE	<11
T	<11
E	<11
X	2

SB9/10-202	35'-37'
A	<29
2-B	5
OTHER VOCs	<12

SB9/10-201	43'-45'
MCL	<19
1,2-DCE	5
TCA	5
OTHER VOCs	<12

SB9/10-205	39'-41'
MCL	10
A	9
1,1-DCE	2
1,2-DCE	86
TCA	50
TCE	<10
1,1,2-TCA	6
OTHER VOCs	<10

SB9/10-204	35'-37'
MCL	10
A	11
X	4
OTHER VOCs	<10

SB9/10-114	15'-17'	20'-22'
A	4	5
T	1	<11
OTHER VOCs	<11	<11

SB9/10-115	15'-17'	20'-22'
MCL	<120	<1,500
T	13	<1,400
OTHER VOCs	<120	<1,400

SB9/10-119	15'-17'	20'-22'
MCL	<5	<5
T	2	4
OTHER VOCs	<11	<11

TWENTY-THIRD AVENUE
SB9/10-110
SB9/10-127
SB9/10-128
SUNDSTRAND PARKING LOT
BLDG
SB9/10-129
FORMER MID-STATES INDUSTRIAL
SB9/10-130
SB9/10-131
J.L. CLARK
BUILDING
PAVEMENT
SB9/10-105
SB9/10-111
NORTH ALLEY
SB9/10-133
SB9/10-134
LOADING DOCK
SB9/10-136
SB9/10-135
SB9/10-103
SB9/10-106
SB9/10-203
SB9/10-101
SUNDSTRAND PLANT # 1
SUNDSTRAND PLANT # 1
SUNDSTRAND OFFICE
J.L. CLARK PARKING LOT
SB9/10-102
SB9/10-107
SB9/10-108
SB9/10-132
BUILDING
SOUTH ALLEY
SB9/10-138
PARKING
SB9/10-137
SB9/10-104
SB9/10-112
SB9/10-113
SB9/10-201
SB9/10-117
SB9/10-118
SB9/10-120
NYLINT
SB9/10-126
SB9/10-202
SB9/10-109
BUILDING
ROCKFORD PRODUCTS FASTENERS
SB9/10-125
ROCKFORD PRODUCTS PARKING LOT
SB9/10-204
SB9/10-116
SB9/10-114
SB9/10-205
SB9/10-115
SB9/10-121
SB11-204
ROHR MANUFACTUR
NYLINT
SB9/10-119
SB9/10-139
KELLY WILLIAMSON PETROLEUM
RR TRACKS
SB9/10-141
SB9/10-142
RR TRACKS
MOBIL
ABOVEGROUND TANKS (3)
BRAND OIL
LIBBY OIL AND CHEMICAL (VACANT)
ROHRBACHER MANUFACTURING (VACANT)
VACANT
NINTH STREET
VILLA da ROMA
PAOLI
SB9/10-124
SB9/10-122
SB9/10-140
HARRISON AVENUE
VACANT
SB9/10-123
BEHR ROCKFORD RECYCLING
SUNDSTRAND STORAGE SHEDS
ELEVENTH STREET
SJOSTROM AND COMPANY
BENNETT MACHINE, OLSON WOODTURNING SHOP
SJOSTROM AND COMPANY

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DATE:	2-05-03

SECOR

AREA 9/10 RI SOIL SAMPLING RESULTS

HAMILTON SUNDSTRAND
AREA 9/10
ROCKFORD, ILLINOIS

JOB NO. 13UN.02072.00 FIGURE 3.11

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actions were undertaken to meet USEPA requirements for the protection of human health and the environment as described in 40 CFR 300.430(e)(2) of the National Contingency Plan (NCP). An integral portion of the objective of the risk assessment was the relationship between the contaminant conditions known or anticipated and the site-wide groundwater. That is, the objective of the SCOU efforts was to control existing/continuing sources of contamination, specifically VOCs, such that they would not continue to degrade site-wide groundwater.

The risks presented by each area within the SCOU were identified in the FFS. Risks were evaluated using SCOU RI analyses for constituents of concern and their concentrations. Risks were also determined for both source media, soil and leachate. Based on the data presented in the SCOU RI, the only contaminant of concern that exhibited concentrations above derived risk levels for soils in Area 9/10 was methylene chloride. Methylene chloride was the only compound identified at a concentration above action limits in the soil analysis data collected during the SCOU RI. However, other compounds, such as PCE, were known to exist at elevated concentrations in the OSA. Although the risks posed by these contaminants were not quantified, remediation objectives were established for these compounds.

Based on the SCOU RI sampling and analyses, the constituents of concern with regard to leachate are DCE, TCA, and PCE. The significant factor with regard to leachate source conditions was predicated on the concentration of TCA identified in MW201 in 1996, given that the elevated concentrations were deemed to represent the likelihood of the presence of a NAPL source.

In order to assess the potential impacts on human health and the environment, the IEPA determined that a groundwater management zone (GMZ) would be established per 35 IAC 620.250 (groundwater quality ARAR). A GMZ allows for the existence of contaminated groundwater within a prescribed area that is undergoing remedial activity in order to bring that groundwater into compliance with the existing standards. The GMZ, once established, would allow concentrations of contaminants to exceed Class I

groundwater standards within its boundaries. Groundwater beyond the GMZ boundary resulting from source materials is required to meet Class I standards. However, the IEPA noted that leachate remediation goals may be modified to consider background concentrations. This means that if upgradient groundwater were determined to be contaminated, allowances would be made in accordance with RCRA to subtract those concentrations from those found in downgradient groundwater when establishing remediation goals for a source area. According to the IEPA, the origin of contaminants coming into a source area does not have to be determined in order to establish background.

With the use of the GMZ ARAR, soil remedial objectives were determined. These objectives were established based on a determination of the allowable concentrations at suspected source areas and their potential to migrate/attenuate up to a proposed GMZ boundary. The specific soil remediation objectives (SROs) derived for Area 9/10 are based on three locations designated as 9/10c, 9/10w, and 9/10ne. Area 9/10c is considered to generally coincide with the loading dock area at Plant #1. Area 9/10w is the OSA located on the western edge of the HS facility near 9th Street. Area 9/10ne is located on the former Midstates Industrial property that lies north of Plant #1. All SROs were derived with respect to the initial proposed GMZ limit identified for the 9/10 source area.

The OSA (location of 9/10w) is the most likely area to exhibit soil concentrations that will require remedial actions based on other data collected in support of the RCRA closure activities. The SRO developed in the FFS for PCE has been established at 43.45 mg/Kg.

Area 9/10 Alternatives Evaluation Summary

The FFS evaluated remedial actions for two media of concern. These media of concern consisted of soil and leachate. The IEPA defined "leachate" (reference FFS) as highly contaminated groundwater within a source area. The remedial alternatives considered and evaluated for soil within Area 9/10 included:

1) 9/10A - No Action;
2) 9/10B - Limited Action; deed restrictions for land use to prevent future site development; and
3) 9/10C - Soil Vapor Extraction (SVE) and deed restrictions on property use.

Alternatives for leachate source control consisted of:

1) 9/10A - No Action; leachate monitoring, groundwater use restrictions, natural attenuation;
2) 9/10/B - Limited Action: leachate monitoring, leachate collection/treatment by air stripping off site surface discharge and groundwater use restrictions;
3) 9/10C - Install injection wells along southwestern GMZ boundary/install air sparging unit/ inject air (or steam), restrict groundwater use;
4) 9/10D - Reactive Barrier Wall/Leachate Monitoring, groundwater use restriction; and
5) 9/10E - Install injection wells along southwestern GMZ boundary and source area, install air sparging unit, inject air (steam), and restrict groundwater use.

Each remedial alternative was initially evaluated with respect to effectiveness, implementability and cost. Additional evaluation of the remedial alternatives with respect to compliance with the NCP was also presented in the FFS report. These NCP criteria consisted of overall protection of human health and the environment, compliance with ARARs, long-term effectiveness and permanence, reduction of toxicity mobility or volume through treatment, short-tem effectiveness, implementability, and cost.

RECORD OF DECISION

In June 2002, the USEPA issued a ROD for Operable Unit 3. The ROD identified the selected remedial actions for each of the four source areas included in the SCOU RI. The remedy selections were supported with historical summaries of the previous two

operable units and RODs, descriptions of the four source control areas, and their contaminant conditions. In addition, the ROD presented a summary of the risks for each area, a listing of remedial action objectives, a summary of all the potential alternatives considered, and responses to public comments made on the proposed plan.

The ROD summarized the risks associated with Area 9/10 as follows: "...Although the risk assessment did not quantify any risks associated with Area 9/10 soils, the agencies selected the following remedial actions..." The selected remedial actions for Area 9/10 include SVE (Alternative SCS-9/10 C) for soil source control and enhanced air sparging (Alternative 9/10E) for leachate source control. A contingent remedial alternative is also described in the ROD that would require the direct removal of NAPLs if they were to be discovered during the subsequent remedial efforts.

The soil source control remedial action is intended to reduce the concentrations of contaminants present in the vadose zone to levels that would no longer be considered a threat to continue to degrade site-wide ground water. The leachate source control remedial action is intended to consider concentrations of contaminants (leachate) in the shallow water-bearing zone.

SECTION 4.0
PRE-DESIGN INVESTIGATION

INTRODUCTION

Task 3 (Data Acquisition) of the SOW requires the collection of supplemental technical data to better assess environmental characteristics at Area 9/10 in support of the design effort. Information from this PDI effort will assist in the RD decision-making process and the eventual completion of the RD.

The PDI work elements have been developed to collect sufficient data to address the following considerations:

- Verify that the Remedial Action Objectives will be met, and that the remedy will achieve the specific remediation goals established for soils and groundwater.
- Determine background concentrations.
- Address ARAR compliance; primarily the requirement to establish an appropriate Groundwater Management Zone, and to ensure compliance with waste management rules and air pollution control regulations.

The elements included in the PDI have been selected to provide the appropriate site information to allow the focused completion of the remedial design package. The main elements of the PDI consist of reconnaissance and field mobilization activities, field sampling activities, and data evaluation and reporting. The data evaluation and summary activities will be discussed in Section 5 of this RD Work Plan.

The reconnaissance and field mobilization activities will provide information and support for the field sampling activities by providing access to properties other than those under control of HS, identification of utility locations (above and below ground) in the investigation area, historical information to assist in refining sample locations and later results interpretation, and basic logistical concerns.

The field sampling activities presented herein will include a discussion of the technical approach for sample collection, including the rationale for selecting the proposed number and location of samples to be collected; matrices to be sampled; type and number of measurements; and analyses to be performed on the samples in support of the RD. Specific details will be presented in the FSP and QAPP to be submitted as separate documents to USEPA. The FSP and QAPP, once approved, will be incorporated as appendices to this RD Work Plan.

As a matter of note, the field activities described herein have been designed to accommodate the collection of additional information in areas of the HS facility beyond those demonstrated to exhibit a risk in terms of the CERCLA efforts performed to date. One area in particular is the OSA. For this reason, certain work, such as analysis of soils for metals at the OSA (a non-risk issue for the SER Site) has been included.

SITE RECONNAISSANCE AND MOBILIZATION

In support of RD activities, HS intends to conduct supplemental surveys at Area 9/10. The surveys will include property boundaries, utility rights-of-way, historical, and topographic information that could affect the selection of locations for intrusive data collection activities (i.e. borings), location and performance of Pilot Study activities, and the ability to complete the design of the selected remedial alternative.

To perform some of the PDI activities, it will be necessary to secure access to properties beyond the direct control of HS. At this time, some of the properties identified consist of the City rights-of-way, Rockford Products parking lot (vicinity of MW201, south of HS facility), and the former Nylint Corporation property. Attempts to gain access will be made via direct discussion and written documentation. Should HS not obtain access after several attempts within a reasonable time frame, the USEPA and IEPA will be asked to assist in obtaining access.

Much of the information to be compiled as part of the reconnaissance effort will be obtained through existing available sources such as the City of Rockford Department of Public Works for underground water and sewer lines. Other utility information will be

derived from facility sources, other utility providers, and by direct locating/identification techniques.

In support of the underground utility/structure identification activities, an electromagnetic (EM) survey or ground penetrating radar (GPR) survey may be performed in certain areas. Such surveys would be conducted to verify or determine the presence of subgrade structures or conditions for the purposes of soil boring/monitoring well location and future design criteria development, such as the vicinity of MW-201 located in the Rockford Products parking area.

As part of the readiness preparation (mobilization) for the field sampling activities, logistic support items such as work areas, mobile office space, sanitary facilities, and communications will be emplaced.

FIELD SAMPLING ACTIVITIES

The field sampling activities will predominantly consist of soil boring and monitoring well installation and the commensurate sample collection associated with these items. A series of soil borings will be advanced for the collection of samples to identify the presence of compounds of concern and to confirm geologic conditions within the area. About half of these soil borings will be completed as monitoring wells to allow for the gathering of information regarding the groundwater characteristics beneath the study area. In addition to the newly installed monitoring wells, several existing wells will be included in this sampling effort.

Soil Borings

Thirty soil borings will be advanced during the PDI field activities. Fifteen of these borings will provide data concerning soil composition and source delineation only. The other 15 borings will also be used in conjunction with monitoring well installation.

Groundwater Monitoring Well Installation and Refurbishment

A total of 15 additional groundwater monitoring wells will be installed within Area 9/10 as part of the PDI field activities. There will be three groups of nested monitoring wells at

Area 9/10. These well nests will be screened to monitor the unconsolidated aquifer groundwater at the water table, at an intermediate depth, and deep (maximum 130 to 150 feet bgs). The existing monitoring wells will be inspected to determine their integrity. Wells that are damaged will be refurbished, if possible, in order to serve as viable monitoring points. USEPA/IEPA monitoring wells that are damaged will be noted for replacement. If necessary, a new monitoring well may be installed near the damaged or abandoned well.

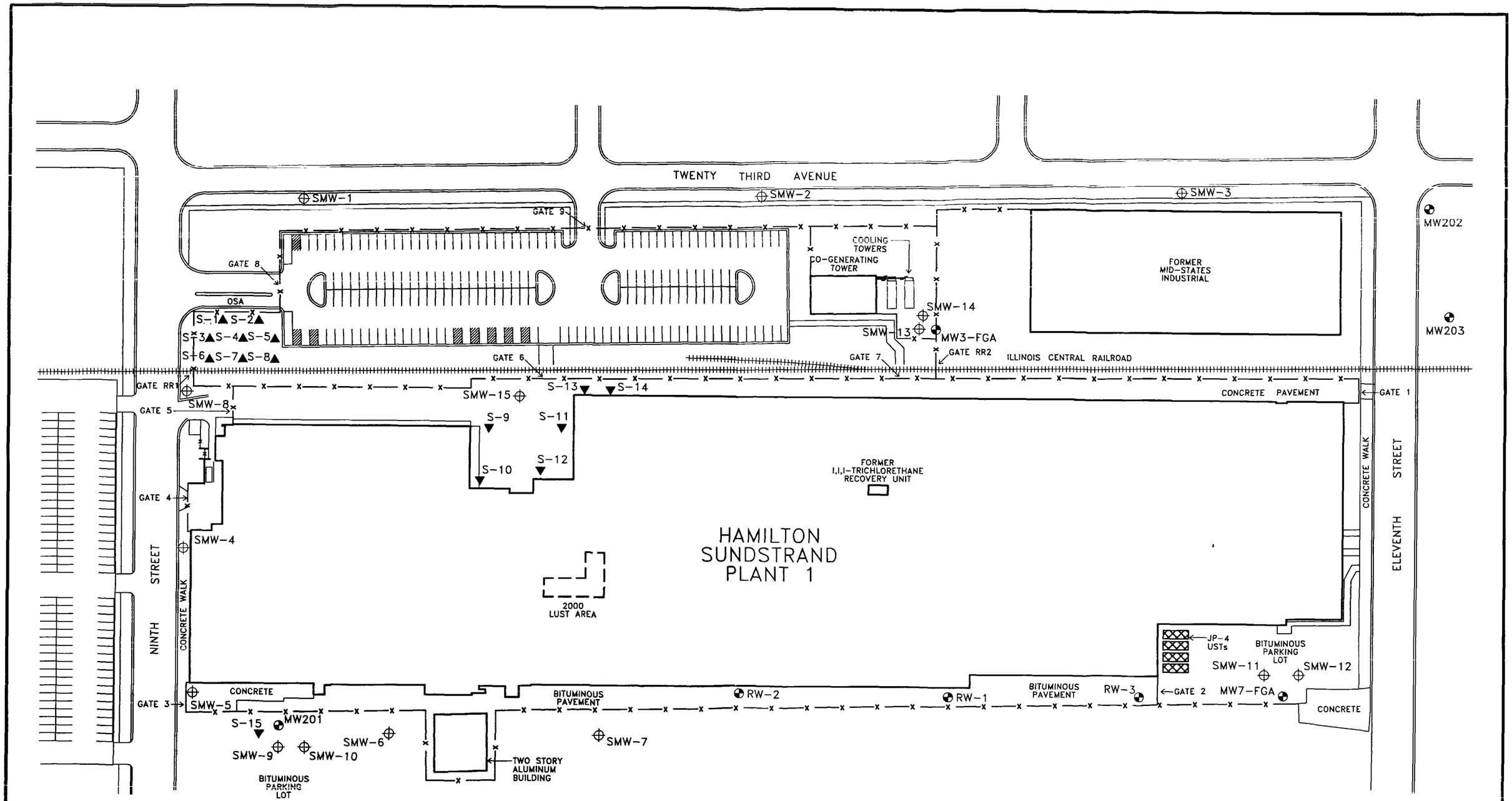
Figure 4.1 depicts the locations for the existing monitoring wells and the proposed monitoring wells. A description of the monitoring well installation is discussed later in this Section. The rationale for the monitoring well placement is described in Table 4.1.

Soil Sampling and Analysis

A total of 170 soil samples (not including quality control samples) will be collected from the proposed 30 borings. All of the collected samples will be analyzed for VOCs and diesel-range organics (DROs for the evaluation of the jet fuel). In addition, select soil samples will be analyzed for RCRA TCLP metals in support of potential additional work activities (excavation of impacted soil within the OSA) that may considered or implemented by HS to meet other regulatory requirements. A description of the proposed soil sampling and analytical methods is provided further below.

Groundwater Sampling and Analysis

A total of 23 groundwater samples (not including QA/QC samples) will be collected from proposed monitoring wells SMW-1 through SMW-15, existing recovery wells RW-1, RW-2, RW-3, and existing monitoring wells MW-3-FGA, MW-7-FGA, MW-201, MW-202, and MW-203. The collected samples will be analyzed for VOCs and DROs to evaluate the samples for the presence of jet fuel. A description of the monitoring well sampling and analytical methods is provided below.



LEGEND:

- EXISTING MONITORING WELL
- FENCELINE
- PROPOSED SOIL BORING
- PROPOSED SOIL BORING/MONITORING WELL

NORTH

0 20 50 100
SCALE IN FEET

DESIGNED BY:	MGD
DRAWN BY:	GLH
APPROVED BY:	MGD
DATE:	2-12-03

SECOR

PROPOSED SOIL BORING AND MONITORING WELL LOCATIONS

HAMILTON SUNDSTRAND
AREA 9/10
ROCKFORD, ILLINOIS

JOB NO. 13UN.02072.00 FIGURE 4.1

S:\PROJECTS\013 lombard projects\13UN.02072.00 Rockford\secor rd\rd workplan\061 figure 4.1.dwg gh 1-21-03

Table 4.1

Rationale for Soil Boring/Monitoring Well Placements
Area 9/10
Remedial Design Work Plan
Rockford, Illinois

Soil Boring/ Monitoring Well Number	Boring Depth/ Screen Interval Below Ground Surface	Location	Purpose
S-1 through S-8	TD approximately 30 feet	OSA	To collect soil and analytical information to aid in the design of the RD Pilot Test and support RCRA closure.
S-9 through S-12	TD approximately 30 feet	Loading Dock Area near the North Alley	To collect soil and analytical information to aid in the RD.
S-13 through S-14	TD approximately 30 feet	Container Storage Area Plant #1	To collect soil and analytical information to aid in the design of the RD.
S-15	TD approximately 30 feet	Near the southwest HS property boundary	To collect soil and analytical information to aid in the design of the RD.
SMW-1	Screen interval approximately 25-40 feet	Northwest from the HS property, along south side of 23rd Avenue	To collect groundwater monitoring data from the upper interval of the saturated zone in that area of the site.
SMW-2	Screen interval approximately 25-40 feet	North from the HS property, along the south side of 23rd Avenue	To collect groundwater monitoring data from the upper interval of the saturated zone in that area of the site.
SMW-3	Screen interval approximately 25-40 feet	Northeast from the HS property, along south side of 23rd Avenue	To collect groundwater monitoring data from the upper interval of the saturated zone in that area of the site.
SMW-4	Screen interval approximately 25-40 feet	Along the west side of HS property boundary, east of 9th Street	To collect groundwater monitoring data from the upper interval of the saturated zone in that area of the site.
SMW-5	Screen interval approximately 25-40 feet	Near the southwest corner of the HS property boundary	To collect groundwater monitoring data from the upper interval of the saturated zone in that area of the site.
SMW-6	Screen interval approximately 25-40 feet	Near the southwest portion of the property, south of the South Alley	To collect groundwater monitoring data from the upper interval of the saturated zone in that area of the site.
SMW-7	Screen interval approximately 25-40 feet	Near the south-central portion of the property, south of the South Alley	To collect groundwater monitoring data from the upper interval of the saturated zone in that area of the site.
SMW-8	Screen interval approximately 25-40 feet	Along the west side of the HS property, south of the North Alley	To collect groundwater monitoring data from the upper interval of the saturated zone in that area of the site.
SMW-9	Screen interval approximately 80-100 feet	Near the southwest portion of the HS property, south of the South Alley near MW-201	To collect groundwater monitoring data from a intermediate interval of the saturated zone in that area of the site.
SMW-10	Screen interval approximately 120-150 feet	Near the southwest portion of the HS property, south of the South Alley near MW-201	To collect groundwater monitoring data from the deeper interval of the saturated zone in that area of the site.
SMW-11	Screen interval approximately 80-100 feet	Near the southeast portion of the HS property, south of the South Alley near MW-7-FGA	To collect groundwater monitoring data from a intermediate interval of the saturated zone in that area of the site.
SMW-12	Screen interval approximately 120-150 feet	Near the southeast portion of the HS property, south of the South Alley near MW-7-FGA	To collect groundwater monitoring data from the deeper interval of the saturated zone in that area of the site.
SMW-13	Screen interval approximately 80-100 feet	Near the southwest portion of the Former Mid-States Industrial property, north of the North Alley near MW-3-FGA	To collect groundwater monitoring data from a intermediate interval of the saturated zone in that area of the site.
SMW-14	Screen interval approximately 120-150 feet	Near the southwest portion of the Former Mid-States Industrial property, north of the North Alley near MW-3-FGA	To collect groundwater monitoring data from the deeper interval of the saturated zone in that area of the site.
SMW-15	Screen interval approximately 25-40 feet	North of the Loading Dock area and south of the North Alley.	To collect groundwater monitoring data from the upper interval of the saturated zone in that area of the site.

SOIL SAMPLING AND ANALYSIS

Prior to drilling activities, all locations will be checked for the presence of subsurface and overhead utilities. Methods of subsurface utility clearance will include: JULIE, consultation with facility representatives, and pre-probing the upper five feet of soil. Soil sampling will be performed in association with the soil borings. Some of the borings will be advanced to accommodate monitoring well installations. A total of 30 soil borings will be advanced. Approximately 15 of these borings will be converted into monitoring wells. Figure 4.1 depicts the locations of the proposed soil borings and monitoring wells.

All soil borings will be advanced using a drill rig equipped with hollow-stem augers. Soil samples associated with the soil borings will be retrieved continuously using a split barrel, or split spoon, sampler. The retrieved undisturbed samples will be field screened for VOCs using a photoionization detector (PID) equipped with an appropriate intensity lamp calibrated to an isobutylene standard. Soil samples from each sampling interval will be placed in laboratory provided containers and placed in an iced cooler pending selection for submission to the laboratory.

In addition to the gross field screen of the core, portions of each core will be segregated and placed in a sealable plastic bag for further field headspace screening. The sample placed in the plastic bag will be allowed to equilibrate at ambient temperatures for at least 10 minutes and then be measured for headspace.

The soil samples to be obtained for laboratory analysis from the eight borings at the OSA (S-1 through S-8) will be collected in two feet intervals. Samples obtained from the ground surface to the water table will be collected for laboratory analyses. A sample from each two feet interval will be analyzed for VOCs, DRO analysis, and RCRA metals (TCLP).

The soil samples from the remaining twenty-two borings will be collected on a continuous basis. Up to two samples for laboratory analysis will be submitted to the laboratory from each boring. The samples selected for analyses will be analyzed for

VOCs and DROs. One sample will be collected from the interval in the boring exhibiting the highest PID headspace. If a boring does not exhibit elevated PID readings but does exhibit staining, then a sample will be collected from the stained interval. In the absence of elevated PID readings or staining, one sample will be collected from an interval just above the water table interface.

Subsurface material will be visually and manually classified by the field geologist under the supervision of a geologist licensed in the State of Illinois. Logs of the borings indicating the depth and identification of various strata, rate of advancement, water elevation information, and pertinent information regarding the method of maintaining and advancing the drill hole will be made. Charts illustrating the soil classification procedure, the descriptive terminology and symbols used on the boring logs will be available for review and included in the Data Evaluation Summary Report.

The extent and distribution of soil contamination will be characterized through the analyses of VOCs, DRO for jet fuel indication, and RCRA metals by TCLP. Samples for VOC analysis will be collected in accordance with Method 5035 with a syringe sampler, and extruded into 40-ml glass vials preserved with methanol and sodium bisulfate provided by the laboratory conducting the analyses. Each VOC soil sample will require 5 gram samples extruded into two sodium bisulfate pre-weighed vials for low level analysis, a 5 gram sample extruded into one methanol preserved pre-weighed vial for medium level analysis, and one non-preserved 4 ounce glass container filled with soil for percent total solids determination. Samples for DRO analysis and TCLP metals will each be collected in 4 ounce glass containers provided by the laboratory conducting the analyses. Disposable nitrile gloves will be worn during the sampling event. Soil samples will be collected based on the screening methods previously mentioned and in accordance with the FSP. Duplicate and field blank samples will also be collected in accordance with the QAPP.

Soil samples will be placed on ice in a cooler in the field following collection. Upon collection of the sample, a description of the sample will be recorded in the project field

book along with the sample collection time and the sample identification number. The sample number, interval and time will also be annotated on the field boring log.

MONITORING WELL INSTALLATION

As mentioned previously, prior to drilling activities, all locations will be checked for the presence of subsurface and overhead utilities. Methods of subsurface utility clearance will include: JULIE, consultation with facility representatives, pre-probing the upper five feet of soil, and in select locations vacuum excavation might be used. All monitoring well installations will be performed by a contractor using a drill rig equipped with hollow stem augers. The procedures for the installation of these wells are presented below. Figure 4.1 depicts the locations of the proposed monitoring wells. All monitoring wells will be constructed and installed in accordance with current USEPA and IEPA guidance relating to the installation of monitoring wells in aquifers.

All wells installed during the PDI field activities will be surveyed with respect to a known geodetic datum point providing measuring point elevations (relative to mean sea level) and coordinates (relative to Illinois State Plane Coordinates) by a surveyor licensed in the State of Illinois. Previously existing monitoring wells to be sampled during the course of the PDI field activities may also be re-surveyed to help assure accurate baseline elevation data.

Monitoring Well Construction

The monitoring wells will be constructed of two-inch inside diameter (I.D.), 15-foot long #20 slot, stainless steel well screens connected to the ground surface by 2 inch (in.) I.D., schedule-40 PVC well casing and/or 2 in. stainless steel riser. Any portion of a monitoring well that will be in contact with groundwater will be constructed of stainless steel. The depth to the water table at Area 9/10 is about 30-35 feet bgs. The average monitoring well screen will be placed in a manner as to bisect the water table at a ratio of five feet above the water table and 10 feet below the water table. The borehole annulus, from the bottom of the boring to a point approximately two feet above the top

of the screen, will be backfilled with clean, medium-grained washed sand, or an appropriate alternative. The remaining borehole annulus will be backfilled with cement/bentonite grout to ground surface. The monitoring wells will be completed at the surface with flush-mounted vaults. At the nested well locations, the deep well will be installed first to help corroborate the appropriate well screen elevations for the subsequent well installations.

Each well will be developed by surging, pumping and/or bailing following the well installation. Development will continue (within reason) until water from the well is free of suspended sediments.

All down-hole drilling equipment will be steam-cleaned prior to initiation of any drilling activities and between each boring. All soil cuttings and decontamination fluids will be containerized and retained at a secure location on-site pending results of characterization analyses. Appropriate disposal of this investigation derived waste (IDW) material will be initiated once it has been properly characterized.

Monitoring Well Refurbishment

The existing monitoring wells will be inspected to determine their integrity. Wells that are damaged will be refurbished, if possible, in order to act as viable monitoring points. USEPA/IEPA wells that are damaged will be noted for replacement. These repairs will most likely be in the form of surficial repairs such as repairing surface grout, casing guards, and well covers. Monitoring wells that are damaged beyond repair will be brought to the attention of the USEPA/IEPA. If necessary, a new monitoring well will be installed near the damaged or abandoned well.

GROUNDWATER SAMPLING AND ANALYSIS

Monitoring wells will be purged prior to sampling. At least three well volumes will be removed during the purging process, unless the well purges dry, at which point the well will be allowed to recharge a sufficient amount to collect the required samples. The

amount of water to be purged per well volume will be calculated according to the following formula:

$(3.1416 \times (r/12)^2) \times (TD-DTW) \times 7.481 = 1$ well volume (gallons)

Where,

r = well radius (inches)
TD = total well depth (feet)
DTW = depth to water (feet)
3.1416 = π
7.481 = constant (gallons per cubic foot)

Field readings of pH, temperature, and conductivity will be performed on samples collected from each purge volume, and noted in the field notebook. A well will be considered adequately purged for sampling when the readings have stabilized ± 10 percent over consecutive readings. If during the purging process the well purges dry, the well will be allowed to recharge a sufficient amount to collect the required samples, the well will be considered adequately purged and the samples will be collected.

The pH/temperature/conductivity meter will be calibrated at the beginning of each day, and again during the midpoint of each day's sampling event. Purge water collected during the sampling event will be containerized and retained at a secure location on-site pending results of characterization analyses. Appropriate disposal of this IDW material will be initiated upon proper characterization.

The extent and distribution of groundwater contamination will be characterized through the analyses of VOCs and DRO. Samples for VOC analysis will be collected in 40-ml glass vials provided by the laboratory conducting the analysis. Samples for DRO analysis will be collected in two 1-liter glass containers provided by the laboratory conducting the analysis. Disposable nitrile gloves will be worn during the sampling event. Monitoring wells will be sampled from the anticipated least impacted to the most

impacted. During sampling, the bailer will be slowly lowered into the well water. VOC samples will be collected by slowly decanting the water in the 40 ml glass vials. Vials will be filled until a convex meniscus is present, and then capped. The cap will then be secured and checked for trapped air. Any samples with entrained air will be discarded, and new samples collected. The DRO analysis samples will be collected by bailer and decanted into the provided containers. Duplicate and field blank samples will also be collected in accordance with the QAPP.

Groundwater samples will be placed on ice in a cooler in the field following collection. Field checklists will be used to verify the proper execution of the sampling tasks. These forms will be completed as part of the field notebook documentation, and submitted with the report. Examples of the field sampling forms is provided in the FSP

INVESTIGATION DERIVED WASTES

During the course of the PDI, both liquid and solid waste streams will be generated. Soils from boring and monitoring well installation, liquids from well development, sampling, and decontamination procedures will be generated. These materials will be collected in appropriate containers at the point of origin. The IDW materials will be moved to an appropriate central collection point for consolidation. For example, based on the number of soil borings to be drilled, a considerable volume of soil cuttings will be generated. These cuttings will be collected at the borehole location and placed in 55-gallon sealable drums and transported to a covered, lined roll-off box where the drums can be consolidated. Representative samples of the consolidated cuttings will be collected and appropriately analyzed to determine the necessary and proper disposal method(s). The same considerations will be made for the collection of IDW liquids. Point of origin collection will take place in various sized containers (drums to portable tanks) depending on the operation being performed (well development versus monitoring well sampling). Appropriate samples will be collected to determine proper and necessary treatment/disposal methods.

LABORATORY ANALYSIS

The laboratory analysis for samples collected during the PDI will be conducted by STL Chicago (STL). The methods and procedures for the analysis to be conducted by STL will be performed in accordance with the QAPP.

SECTION 5.0
DATA EVALUATION

Task 6 of the SOW requires an evaluation of data collected during Pre-Design Investigative activities. Data evaluation efforts would focus on the following:

- Usability of data collected.
- Data evaluation and tabulation in a manner that supports continued RD efforts. Specifically, soil, groundwater, and waste data (if needed) would be evaluated,
- Review of contaminant data and transport modeling needs (if any).
- Development of Data Evaluation Summary Report.

DATA EVALUATION SUMMARY REPORT

Data collected from RD field activities will be reviewed and incorporated in a report to be submitted to the USEPA and IEPA. The Data Evaluation Summary Report (Summary Report) will include the following:

- **Background Information**. The Summary Report will briefly discuss Area 9/10 history, environmental setting, geology, hydrogeology, surface water and previous environmental investigations undertaken at Area 9/10.

- **Field Activities**. The Summary Report will contain descriptions of the PDI field activities. Details concerning soil borings, monitoring well installation or refurbishment, and groundwater monitoring activities will be presented.

- **Analytical Results.** Analytical results from the PDI sampling events will be discussed in the Summary Report. Analytical results will include the soil analytical results, groundwater analytical results, and IDW analytical results.

- **Summary and Conclusions.** Findings from the PDI Field Activities will be summarized and conclusions presented. The conclusions would include an opinion as to whether Area 9/10 was adequately characterized and provide a benchmark for decision-making for continued RD activities.

- **Additional Activities.** Additional assessment activities, if necessary, will be recommended based upon the conclusions reached after evaluation of the RD data.

SECTION 6.0

PILOT STUDY

INTRODUCTION

Section VIII of the AOC (Work to be Performed) and Task 7 of the SOW (Pilot Testing) requires the completion of pilot tests as appropriate. The pilot test to be performed will include installation and operation of a small-scale soil vapor extraction (SVE) system and in-situ air sparge (AS) system. The purpose of the pilot test is two-fold: 1) to verify the technical practicability of the selected remedy (AS/SVE) within Area 9/10, and 2) to provide engineering data to establish performance criteria for design completion.

A complete pilot test discussion will be presented in the Pilot Test Work Plan (PTWP) that will be prepared and submitted for approval prior to the performance of the pilot testing activities. The PTWP will include the results of a review of available testing information on Area 9/10 and a literature search and review on a broader scale. The PTWP will present in detail the specific elements of the pilot test scope, methodology, testing components, etc. Some of this information, which will provide the basis of the PWTP, is presented in the following paragraphs.

PILOT TEST PLANNING

HS intends to conduct a pilot test using a portable small-scale AS/SVE system. Although the system components may have application for eventual RA activities, its installation, operation, and use is strictly temporary and will most likely be disassembled once Pilot Study activities are complete.

For purposes of this RD Work Plan, HS has presumed the pilot test system will be located in the OSA on the assumption that the OSA is a suitable location for testing. However, the final location will be based on the findings from the PDI.

The following pilot test activities discussion represents a conceptual overview. Final details, such as the number and location of monitoring points, system operating and performance criteria, data collection and frequency, etc., will be included in the PTWP and may require modification based on field PDI findings/indications. A conceptual AS/SVE Pilot Test Layout is shown in Figure 6.1.

AIR SPARGING SYSTEM

General Process Flow

The AS system will include an air compressor large enough to provide sufficient pressure and airflow ranging from 3 to 6 standard cubic feet per minute (scfm) and 6 to 20 pounds per square inch gage (psig), a manual pressure relief valve, a pressure gauge, a flow meter, and a control panel. A general process flow diagram is shown in Figure 6.2.

Sparge Well

The AS system will include a sparging well for air delivery, and up to six monitoring points ranging from 15 to 20 ft from the sparge well. Monitoring points will be constructed with 2 inch I.D., schedule 40 PVC pipe. Joints will be flush threaded with the sparge well also containing "O" rings at the joints to prevent air leakage. The well screen will consist of slotted PVC pipe ranging from 2 to 5 ft. in length (2 ft. for the sparge well and up to 5 ft. for the monitoring points). The sparge well may be completed to a depth of 5 to 10 ft. below the water table (depending on well screen length selection). Monitoring points will be located at roughly 15 ft. intervals mostly downgradient of the sparge well and completed in the saturated and unsaturated zones. Conceptual well and monitoring point locations are shown in Figure 6.1. Typical well details are shown in Figure 6.3.

GUARD STATION

GATE 8

PARKING

NINTH STREET

VESM-1 VESM-2 VE-1 AS-1 VESM-3

AIR/ WATER SEPERATOR

SVE BLOWER

AS COMPRESSOR

VAPOR TREATMENT SYSTEM (IF NEEDED)

CONTROL PANEL

ASDM-4

GROUND WATER FLOW

VEDM-4
ASDM-1

VEDM-6
ASDM-3

VEDM-5
ASDM-2

ILLINOIS CENTRAL RAILROAD

GATE RR1

LEGEND:

- △ SOIL VAPOR EXTRACTION WELL
- ▲ VAPOR EXTRACTION WELL
  - • VESM – SHALLOW WELL
  - • VEDM – DEEP WELL
- ⊕ AIR SPARGING WELL
- ⊗ AIR SPARGE MONITORING WELL
  - • ASDM – DEEP WELL

NOTE: CONCEPTUAL PURPOSES ONLY. LAYOUT FEATURES ARE BASED ON DRAWINGS PREPARED BY HARDING LAWSON ASSOCIATES, INC. 1992.

NORTH

0 2 5 10
SCALE IN FEET

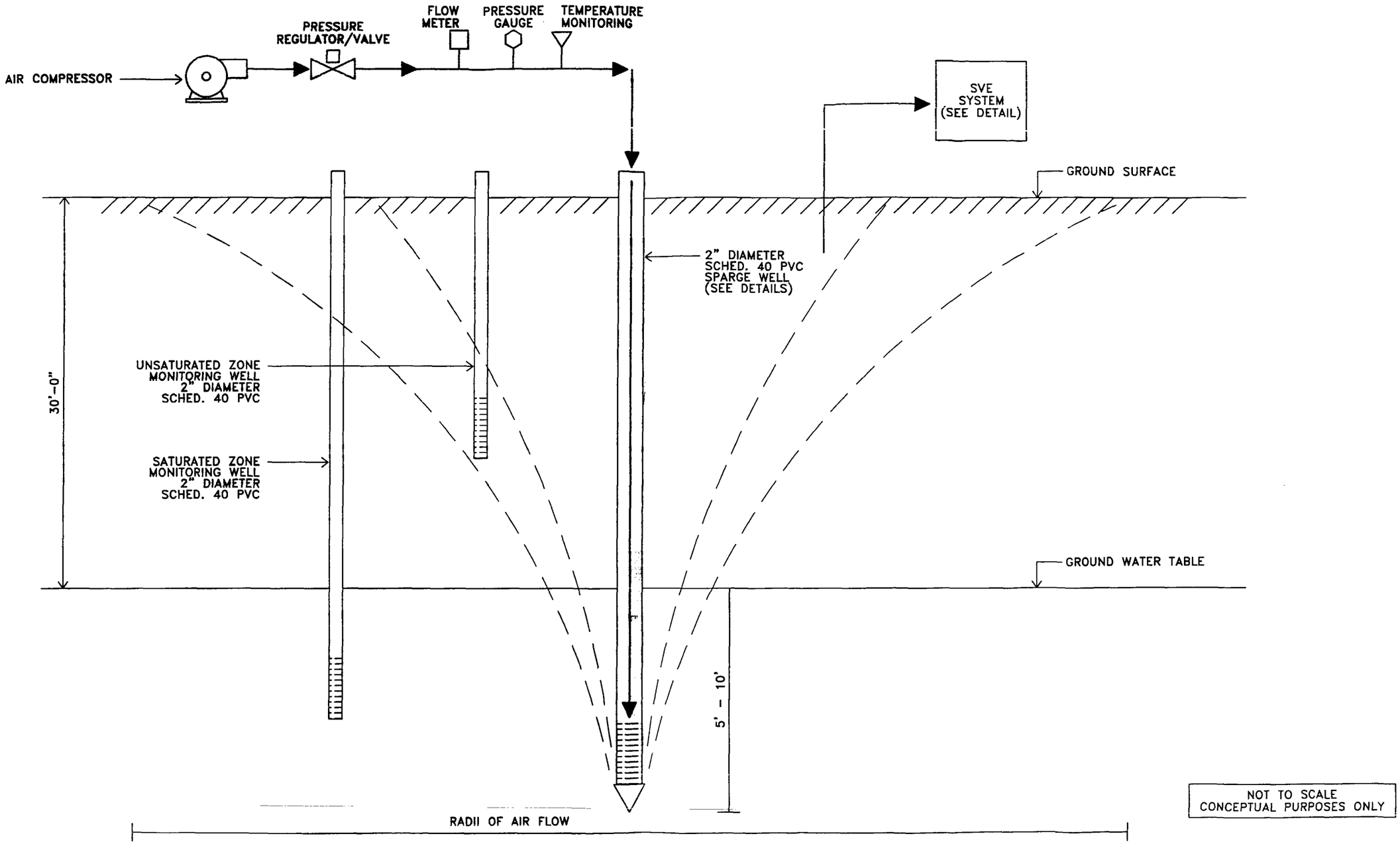
DESIGNED BY:	JGH
DRAWN BY:	GLH
APPROVED BY:	DMC
DATE:	2-12-03

SECOR

PILOT TEST SYSTEM LAYOUT
OUTSIDE STORAGE AREA
HAMILTON SUNDSTRAND
AREA 9/10
ROCKFORD, ILLINOIS

JOB NO. 13UN.02072.00 FIGURE 6.1

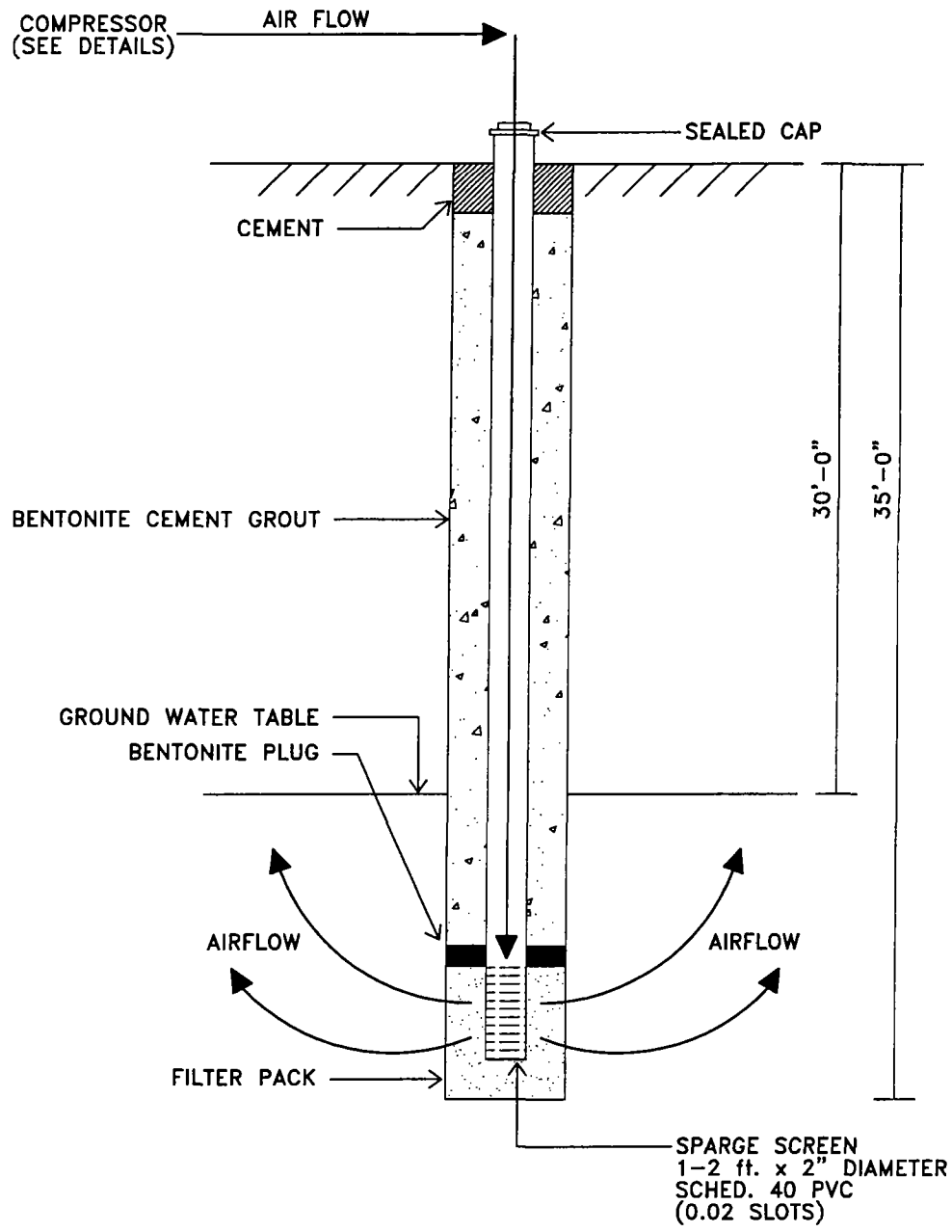
S:\PROJECTS\013 lombard projects\13UN.02072.00 Rockford\secor rd\rd workplan\081 figure 6.1.dwg gh 1-27-03



NOT TO SCALE
CONCEPTUAL PURPOSES ONLY

DESIGNED BY: JGH	SECOR	AS SYSTEM CONCEPTUAL PROCESS FLOW PILOT TEST HAMILTON SUNDSTRAND AREA 9/10 ROCKFORD, ILLINOIS
DRAWN BY: GLH		
APPROVED BY: DMC/MGD		
DATE: 2-12-03		JOB NO. 13UN.02072.00 FIGURE 6.2

S:\PROJECTS\013 lombard projects\13UN.02072.00 Rockford\secor rd\rd workplan\061 sve system.dwg gh 1-25-03



NOT TO SCALE
CONCEPTUAL PURPOSES ONLY

DESIGNED BY: JGH	SECOR	AIR SPARGE WELL TYPICAL DETAIL PILOT TEST HAMILTON SUNDSTRAND AREA 9/10 ROCKFORD, ILLINOIS
DRAWN BY: GLH		
APPROVED BY: DMC/MGD		
DATE: 2-12-03		JOB NO. 13UN.02072.00 FIGURE 6.3

S:\PRO.ECTS\013 lombard projects\13UN.02072.00 Rockford\secor rd\rd workplan\061 sve system.dwg gh 1-25-03

SOIL VAPOR EXTRACTION SYSTEM

General Process Flow

The SVE system would include a blower with a maximum vacuum capacity of 85 in. water column (w.c.) and a maximum flow rate of 225 scfm, an air water separator, flow meter, pressure and vacuum monitoring points, temperature gage, sampling port(s), extraction well, and a treatment system for extracted vapors (if needed). A general process flow diagram is shown in Figure 6.4.

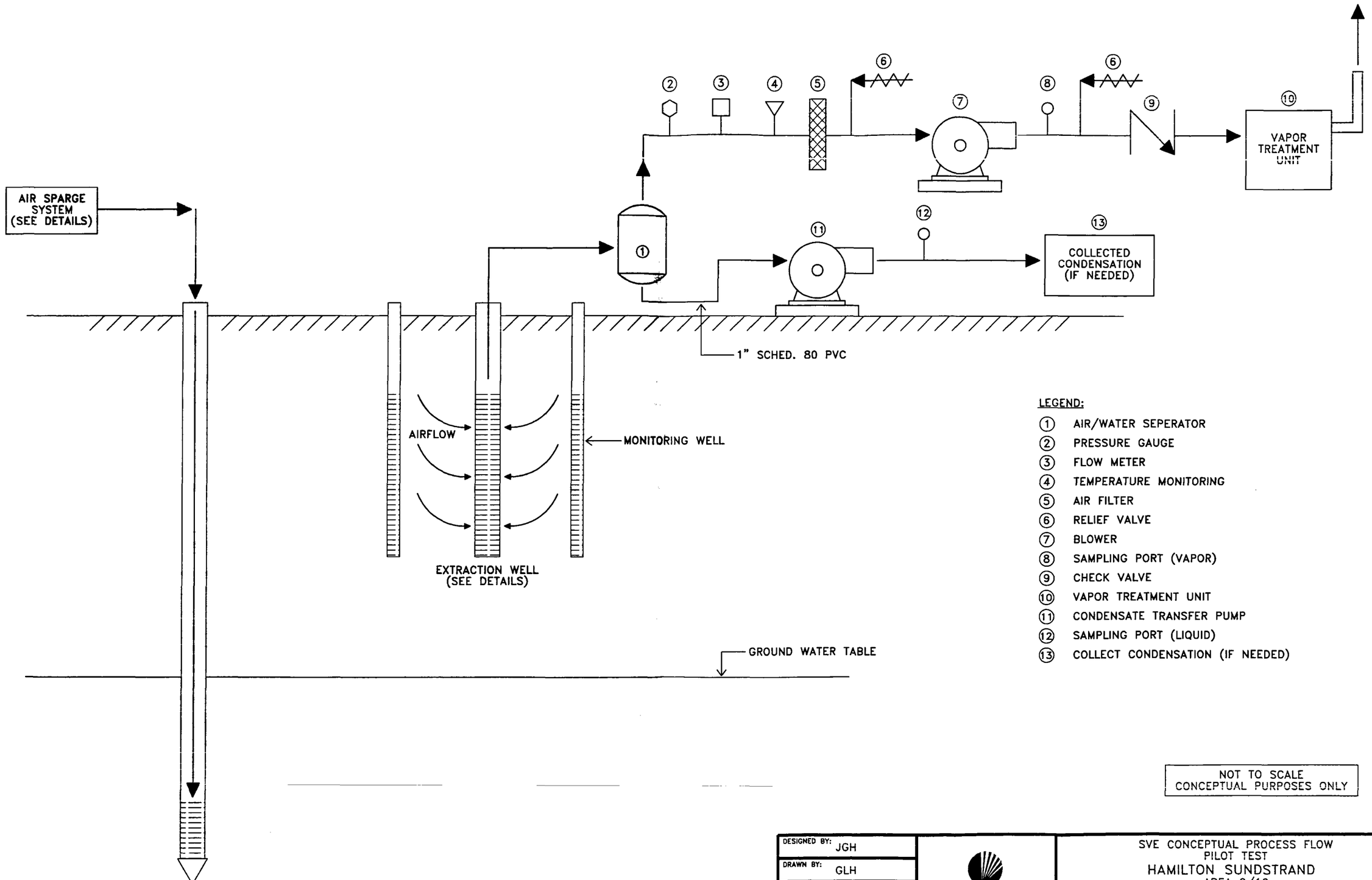
SVE Wells

The SVE system will include an air extraction well for vapor extraction, and monitoring wells to assess SVE system performance. HS may use a series of wells currently located in the OSA should the OSA be the selected pilot test location. These wells were used during historical investigative activities and may be suited for the SVE portion of the pilot test. All existing wells are constructed of 2 in. I.D., schedule 40 PVC. Screens are constructed of slotted PVC (0.010 slots). Existing well construction details are summarized in Table 6.1. Well locations are shown in Figure 6.1. Typical well details are shown in Figure 6.5.

HS anticipates operation of the AS/SVE pilot test system will encompass 2-3 days (one day – startup, 2 days operation and monitoring).

DATA COLLECTION

During the pilot test, data will be collected to assess system performance. Of particular interest will be the radii of influence for the AS system and the ability to remove contaminant mass from saturated conditions.



NOT TO SCALE
CONCEPTUAL PURPOSES ONLY

DESIGNED BY: JGH	SECOR	SVE CONCEPTUAL PROCESS FLOW PILOT TEST HAMILTON SUNDSTRAND AREA 9/10 ROCKFORD, ILLINOIS
DRAWN BY: GLH		
APPROVED BY: DMC/MGD		
DATE: 2-12-03		JOB NO. 13UN.02072.00 FIGURE 6.4

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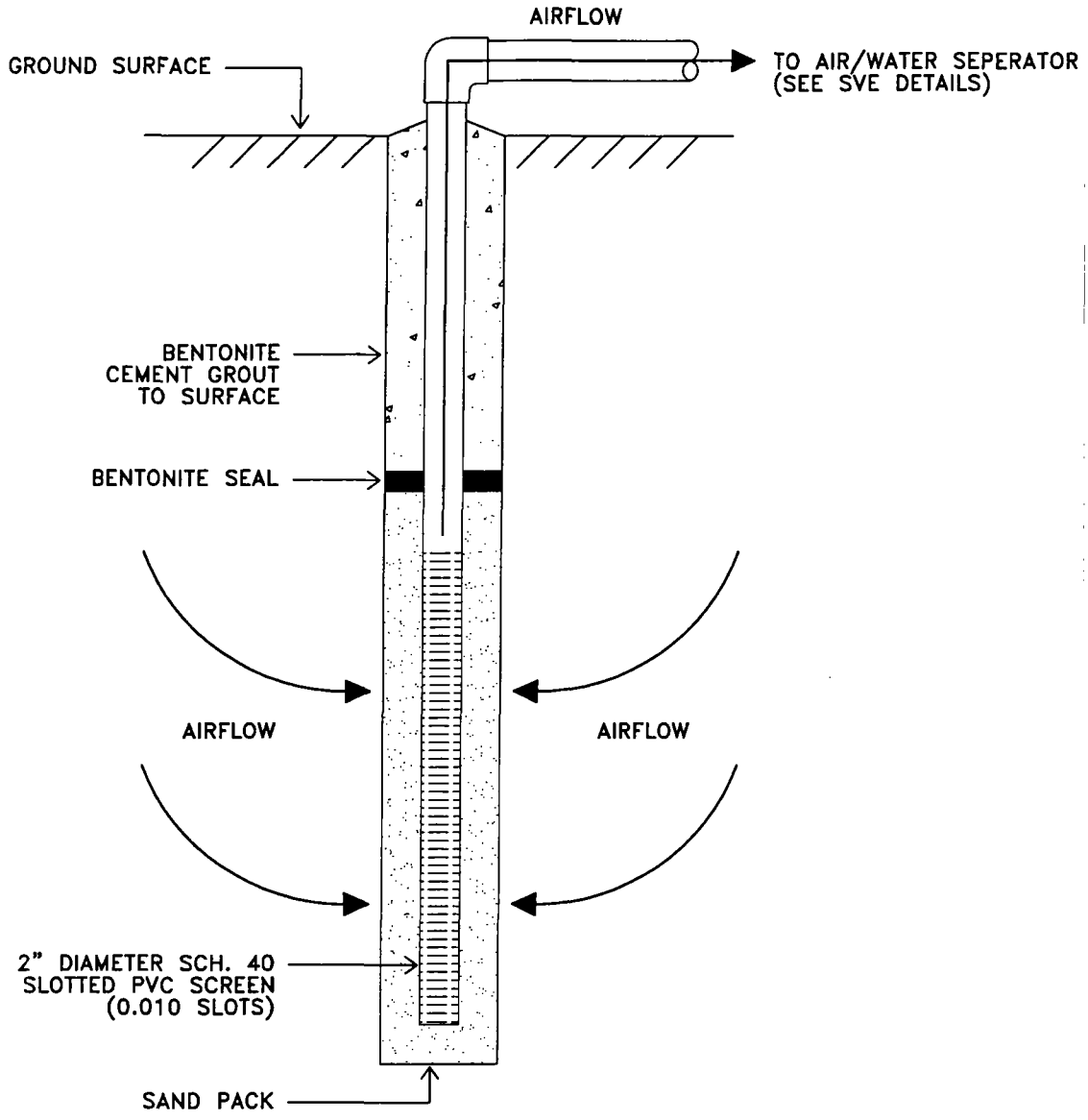
TABLE 6.1
EXISTING SVE WELL DETAILS
AREA 9/10
REMEDIAL DESIGN WORK PLAN
ROCKFORD, ILLINOIS

CURRENT MONITORING WELL DESIGNATION	PILOT TEST MONITORING WELL DESIGNATION	WELL DEPTH (ft. bgs)	WELL SCREEN (ft.)
VE-1	VESM-1	4.5	2.0
VE-2	VESM-2	4.5	2.0
VE-3	VE-1	19.0	10.0
VE-4	VESM-3	4.5	2.0
VE-5	VEDM-4	19.0	10.0
VE-7	VEDM-5	19.0	10.0
VE-9	VEDM-6	19.0	10.0

Note: Extraction well details based on boring log details highlighted in RCRA Closure Plan Modification Plant 2 OSA dated September 30, 1992 prepared by Harding Lawson Associates.

VESM – Vapor Extraction Shallow Monitoring Well
VEDM – Vapor Extraction Deep Monitoring Well
Bgs – below ground surface



NOT TO SCALE
CONCEPTUAL PURPOSES ONLY

DESIGNED BY: JGH	SECOR	EXTRACTION WELL TYPICAL DETAILS PILOT TEST HAMILTON SUNDSTRAND AREA 9/10 ROCKFORD, ILLINOIS
DRAWN BY: GLH		
APPROVED BY: DMC/MGD		
DATE: 2-12-03		JOB NO. 13UN.02072.00 FIGURE 6.5

S:\PROJECTS\013 lombard projects\13UN.02072.00 Rockford\secor rd\rd workplan\061 sve system.dwg gh 1-25-03

Performance

AS/SVE performance will be monitored through the following operating parameters:

- Pressure/Vacuum – monitored for the AS and SVE system
- Air flow rates
- Temperatures

Treatability

The ability for the AS/SVE to effectively treat impacted media will be monitored through sampling and analysis of select in-situ and AS/SVE system parameters. Planned parameters include:

- VOCs (groundwater and soil gas)
- Dissolved oxygen (groundwater)
- Redox potential (groundwater)
- PH (groundwater)
- Carbon Dioxide (groundwater)

Sampling and analytical activities will be detailed in the FSP and QAPP.

PILOT TEST SUMMARY REPORT

Upon completion of the pilot tests, HS will prepare a Pilot Test Summary Report (PTSR). The PTSR will highlight pilot test findings and discuss the ability of AS/SVE to meet stated remedial goals, identify additional data gaps requiring further analysis (if needed), and practical implementation of the selected remedial alternatives.

SECTION 7
DESIGN

Tasks 8, 9, & 10 of the SOW highlight the design components of the RD (Preliminary Design, Pre-Final Design, and Final Design, respectively). Proposed activities are discussed below.

PRELIMINARY DESIGN

The preliminary design generally reflects the basic information elements that culminate in the completion of a set of technical plans and specifications for construction purposes. The preliminary design typically reflects about 30% of the design effort and is often referred to as the "30% design". Elements of the preliminary design are discussed below.

Basis of Design Report

A Basis of Design Report (BODR) will be prepared that highlights technical data, evaluations, and assumptions for design of the selected remedy. Information within the BODR will include: design calculations; process flow diagrams; proposed site layout; ability to meet ARARs; minimization of environmental and public impacts; and ability to meet permit requirements/equivalencies.

Design Calculations

Calculations will be performed as required to fully develop and complete the RD. Examples of design calculations would include:

- Areas where contaminant capture zone(s) are required
- Sizing of the SVE system including piping, pumps, blowers, instrumentation, and other ancillary equipment
- Sizing of pollution control equipment (if needed)

Calculations will be completed using a standard format including a description of the calculations, client name, project number, individual(s) who prepared the calculations, and individuals who provided a review/concurrence function.

Calculations will also be submitted (if needed) during subsequent design deliverable processes, but will not be part of the final design.

Proposed Site Layout

A drawing will be prepared that depicts the proposed Site Layout. This will be a surveyed drawing that details existing topographic features and Site property boundaries. Proposed location for the remediation system(s) will be identified. Site layout information will be based on survey data collected by an Illinois-licensed Professional Land Surveyor.

ARARs

A discussion of ARARs, and the ability of the proposed SVE/AS to meet them will be included.

Minimization of Impacts

The BODR will provide a general discussion of measures that could be implemented (if needed) during remedial activities that will minimize potential impacts to the public and environment.

Permits

The BODR will identify permit requirements and equivalencies that will be necessary for remedy implementation. During BODR development, should it be

determined that an ARAR cannot be met, HS will prepare a technical memorandum to the USEPA and IEPA that describes the issue and offers technical solutions (if any).

Preparation of Drawings

Technical plans and engineered drawings will be prepared to illustrate the location, configuration and key elements of the remedial system. The drawings will be prepared in sufficient detail (reflecting a 30% completion effort). Drawing size will be 22 X 34 in. (D-size). Drawings may be reduced for some submittals for practicality. Their size would typically be 11 x 17 in. (half-size), but would be clearly identified as to scale. Drawings will be prepared in accordance with the relevant engineering standard of care for the profession.

Anticipated drawings may include:

- General
  - Cover Sheet
  - Site Location
  - Sheet Index, Detail Identification, Symbol Identification and other information
- Civil/Structural
- Architectural (if needed)
- Electrical
- Mechanical

Preparation of Technical Specifications

Technical specifications, which will be used to construct the remediation system, will be prepared to describe the materials, equipment, performance standards, and procedures. The primary purpose of the technical specifications are to precisely describe equipment and materials the selected contractor must provide and install, and

identify specific management, administrative, and reporting requirements for work completion to the satisfaction of HS.

Technical specifications will be formatted in accordance with the Construction Specifications Institute (CSI). A preliminary list of technical specifications anticipated to be used is summarized in Table 7.1. Additional specifications may be incorporated in later design submittals as the design process continues.

PRE-FINAL DESIGN

The pre-final design typically is the draft version of the final design. The pre-final design addresses comments received during the preliminary design reviews and is often referred to as the "95% design."

Activities to be completed during this portion of the RD for submission to USEPA and IEPA include:

- Preparation of Pre-final Technical Drawings
- Preparation of Pre-final Technical Specifications
- Preparation of Final Basis of Design Report

FINAL DESIGN

Upon disposition of comments from the Pre-final Design (if any), Final Technical Drawings and Specifications will be completed. Final documents will be stamped/sealed by the appropriate Illinois-licensed design professional.

The Final (or 100%) Design will most likely be used for procuring a responsible, responsive contractor to complete planned remedial activities.

DESIGN SUBMITTALS

Design documents that are to be submitted to USEPA and IEPA are discussed in Section 8.0 and summarized in Table 8.1.

REMEDIAL DESIGN QUALITY ASSURANCE/QUALITY CONTROL

To help assure remedial design deliverables are of high quality and meet the requirements set forth in the AOC and SOW as well as the engineering standard of care, the following general practices will be used for design quality assurance/quality control (QA/QC):

- Remedial design deliverables will be peer reviewed by qualified individuals prior to submission to USEPA and IEPA for comment.
- Calculations made for design activities will be checked by a qualified person who has not been involved with the design calculations in question.
- Pre-final and final design deliverables will undergo review by a team of engineers, scientists or other relevant professionals who were not involved with developing the aforementioned documents.
- Final design deliverables will be sealed by the appropriate, qualified design professional.

TABLE 7.1
TABLE OF PRELIMINARY CONTENTS FOR TECHNICAL SPECIFICATIONS
AREA 9/10
REMEDIAL DESIGN WORK PLAN
ROCKFORD, ILLINOIS

SECTION NUMBER	TITLE
Division 01 – General Requirements	
01110	Summary of Work
01140	Work Restriction
01180	Project Utility Sources
01200	Price and Payment Procedures
01310	Project Management and Coordination
01320	Construction Progress Documentation
01330	Submittal Procedures
01410	Regulatory Requirements
01420	Reference Standards
01430	Quality Assurance
01450	Quality Control
01500	Temporary Facilities and Controls
01600	Product Requirements
01770	Project Closeout
01830	Operation and Maintenance
Division 02 – Site Work	
02055	Soils
02105	Chemical Sampling and Analysis
02110	Excavation, Removal, and Handling of Hazardous Materials
02120	Off-Site Transportation and Disposal
02130	Site Decontamination
02150	Hazardous Waste Recovery Processes
02210	Subsurface Investigation
02230	Site Clearing
02500	Utility Services
02820	Fences and Gates
02895	Markers and Monuments
02950	Site Restoration and Rehabilitation
Division 03 - Concrete	
03050	Basic Concrete Materials and Methods
Division 13 – Special Construction	
13400	Measurement and Control Instrumentation
Division 15 – Mechanical	
05110	Valves
15120	Piping Specialties
15130	Pumps
15200	Process Piping
Division 16 – Electrical	
16050	Basic Electrical Materials and Methods
16200	Electrical Power
16300	Transmission and Distribution

SECTION 8.0
SUMMARY OF MAJOR SUBMITTALS

A number of deliverable work products are required by the AOC/SOW for submission to USEPA for review and approval.

Table 8.1 summarizes each deliverable, the task referenced in the SOW, the number of copies to be provided to USEPA, and the scheduled (in accordance with the AOC) or anticipated delivery date. While developing the RD schedule, HS has assumed USEPA will respond with either comments, conditional approvals, or approvals within 45 days of deliverable submission.

The projected RD schedule is detailed in Section 9.0.

TABLE 8.1
MAJOR SUBMITTALS
AREA 9/10
REMEDIAL DESIGN WORK PLAN
ROCKFORD, ILLINOIS

TASK IN SOW	DELIVERABLE	NO. OF COPIES	DELIVERY DATE (CALENDAR DAYS)
1.1.2.1	RD Work Plan	3	February 27, 2003
	Revised RD Work Plan	3	15 days after receipt of EPA comments
1.2.1	Health and Safety Plan (HASP)	3	March 31, 2003
	Revised HASP		15 days after receipt of EPA comments
1.2.3.2	Field Sampling Plan (FSP)	3	March 31, 2003
	Revised FSP		15 days after receipt of EPA comments
1.2.2.1	Quality Assurance Project Plan (QAPP)	3	March 31, 2003
	Revised QAPP		15 days after receipt of EPA comments
1.3.1	Monthly Progress Reports	3	Fifth day of every month following the AOC finalization.
1.4.1	Support Services Procurement	3	As subcontractors are retained
7.2	Pilot Test Work Plan	3	June 2, 2003
6.4	Data Evaluation Summary Report	3	February 16, 2004
7.6	Pilot Test Summary Report	3	March 1, 2004
8.1	Preliminary (30 %) Remedial Design • Technical Drawings • Basis of Design Report	3	June 30, 2004
	Response to Design Review Comments	3	21 days after design review meeting
9.1	List of Long-Lead Procurement Items	3	21 days after Preliminary Design approval
10.1-10.3	Pre-Final (95%) Remedial Design • Pre-Final Design Specifications • Pre-Final Design Drawings • Final Basis of Design Report	3	60 days after Preliminary Design approval
10.4	100 Percent Design • Final Remedial Design Plans • Final Remedial Design Specifications	3	30 days after pre-final design comments received

SECTION 9.0
REMEDIAL DESIGN SCHEDULE

HS has prepared a proposed RD schedule that reflects the activities required by the AOC/SOW and deemed necessary for the implementation of the ROD for Area 9/10. It is based on a project start date of January 13, 2003 (the effective date of the AOC). Activities and select project milestones are shown in Table 9.1. HS has assumed USEPA review and approval efforts on major deliverables will not exceed 45 days. Based on this assumption, field activities (pre-design investigation and Pilot Study) could begin as early as September-October 2003 with completion anticipated by mid-to late October 2003. Based on field activity findings, actual design efforts could begin by May 2004 with completion by February 2004.

FIGURE 9.1
PROPOSED SCHEDULE
AREA 9/10
REMEDIAL DESIGN WORK PLAN
ROCKFORD, ILLINOIS

ACTIVITY	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	JAN	FEB
1. RD Work Plan Submitted to USEPA/IEPA	(2/27)		(4/15)	(4/22)		(7/1)																			
2. Pre QAPP Meeting	(2/19)					(7/1)																			
3. Health and Safety Plan (HASP) Submitted to USEPA/IEPA		(3/31)	(4/15)	(4/22)		(7/1)																			
4. Revised RD Work Plan Submitted to USEPA/IEPA			(4/30)			(7/1)																			
5. Field Sampling Plan (FSP) Submitted to USEPA/IEPA		(3/31)		(5/16)	(5/22)	(7/1)																			
6. Quality Assurance Project Plan (QAPP) Submitted to USEPA/IEPA		(3/31)		(5/16)	(5/22)	(7/1)																			
7. Revised FSP,QAPP, and HASP Submitted to USEPA/IEPA (if necessary)					(6/2)	(7/1)																			
8. Monthly Progress Reports	(2/5)	(3/5)	(4/5)	(5/5)	(6/5)	(7/5)	(8/5)	(9/5)	(10/5)	(11/5)	(12/5)	(1/5)	(2/5)	(3/5)	(4/5)	(5/5)	(6/5)	(7/5)	(8/5)	(9/5)					
9. Support Services Procurement		(as	needed)																						
10. Pilot Test Work Plan (PTWP) Submitted to USEPA/IEPA					(6/2)	(7/15)	(7/22)																		
11. PDI Reconnaissance and mobilization								(8/31)																	
12. Revised PTWP Submitted to USEP/IEPA							(8/1)																		
13. Pre-Design Investigation Field Activities								(10/15)																	
14. Pilot Test									(10/31)																
15. Data Evaluation Summary Report													(2/16)												
16. Pilot Test Summary Report													(3/1)	(3/9)											
17. Preliminary (30%) Remedial Design – Technical Drawings – Basis of Design Report																	(6/30)		(7/16)	(8/1)					
18. Response to Design Review Comments																				(21 days)					
19. List of Long-Lead Procurement Items																					(21 days)				
20. Pre-Final (95%) Remedial Design – Pre-final Design Specifications – Pre-final Design Drawings – Final Basis of Design Report																						(60 days)			
21. 100 Percent Design – Final Remedial Design Plans – Final Remedial Design Specifications																									(30 days)

LEGEND:

- ACTIVITY TIMELINE
- (2/12) SPECIAL ACTIVITY DATE
- ▲ USEPA/IEPA MEETING (IF NECESSARY)
- ● PROGRESS REPORT
- ★ ANTICIPATED USEPA/IEPA REVIEW COMMENTS
- ◆ ANTICIPATED USEPA/IEPA APPROVAL

SECTION 10.0
REFERENCES

The following is a listing of the general information sources utilized in the preparation of the RD Work Plan. The predominant use of these references was in the development of historical and background information to support the RD effort.

Harding Lawson and Associates, RCRA Closure Plan Modification, Plant 2 Outside Storage Area, September 30, 1992.

Camp Dresser & McKee (CDM) Final Remedial Investigation Report Southeast Rockford Groundwater Contamination Study, January 1995.

USEPA, Record of Decision, Southeast Rockford Groundwater Contamination Site, September 29, 1995.

Camp Dresser & McKee (CDM), Source Control Operable Unit Remedial Investigation Report, July 25, 2000.

Camp Dresser & McKee (CDM), Source Control Operable Unit Focused Feasibility Report, September 5, 2000.

USEPA, Source Control Operable Unit Proposed Plan, June 2001.

Nationwide Environmental Services, Inc., Summary of Ground water Sampling Results, June 1999 – October 2001, Southeast Rockford Superfund Site, Rockford, Illinois, February 2002.

USEPA, Record of Decision, Southeast Rockford Groundwater Contamination Site, Source Control Operable Unit Three, July 11, 2002.

USEPA and Hamilton Sundstrand Corporation, Administrative Order On Consent for Remedial Design, January 13 2003.

APPENDICES

APPENDIX A
FIELD SAMPLING PLAN

Remedial Design Field Activities
Area 9/10
Rockford, IL
SECOR Project No.: 13UN.02072.00
February 27, 2003

TO BE SUBMITTED AT A LATER DATE.

APPENDIX B
QUALITY ASSURANCE PROJECT PLAN

Remedial Design Field Activities
Area 9/10
Rockford, IL
SECOR Project No.: 13UN.02072.00
February 27, 2003

TO BE SUBMITTED AT A LATER DATE.

APPENDIX C
HEALTH AND SAFETY PLAN

Remedial Design Field Activities
Area 9/10
Rockford, IL
SECOR Project No.: 13UN.02072.00
February 27, 2003

TO BE SUBMITTED AT A LATER DATE.